Vol. 17, No. 11
November 1992

Energy Research Abstracts

Abstracts 30419–32578

Office of Scientific and Technical Information
UNITED STATES DEPARTMENT OF ENERGY

The Office of Scientific and Technical Information

The Office of Scientific and Technical Information (OSTI) in Oak Ridge, Tennessee, provides direction for the Department of Energy's scientific and technical information (STI) program and maintains a centralized base of support to assist Departmental elements in planning, developing, and implementing STI activities. DOE-originated and worldwide literature and software on advances in subjects of interest to DOE researchers is collected, processed, and disseminated using computerized databases, publications, and other media.

This information collection containing over three million citations represents a major national resource of scientific and technical information. In addition to information acquired from DOE and its contractors, DOE acquires information through its international partnerships with the International Energy Agency's Energy Technology Data Exchange (ETDE), a consortium comprised of members from Europe, Japan, Canada, and the United States; the International Atomic Energy Agency's International Nuclear Information System, representing 80 countries; bilateral agreements with foreign governments; exchange agreements with other U.S. government agencies; and contracts with private information organizations and professional societies.

The subject scope of this information extends beyond energy, covering basic scientific studies in such areas as radiology, atomic and nuclear physics, radiation and nuclear chemistry, superconductivity, supercomputers, the environment, radioactive waste management, nuclear medicine, and arms control.

Major DOE databases are available within the United States through DIALOG Information Services and STN International and outside the United States through formal governmental exchange agreements. DOE and DOE contractor offices can access the databases online through the Integrated Technical Information System (ITIS) maintained by OSTI.

UNITED STATES DEPARTMENT OF ENERGY
Office of Scientific and Technical Information
Post Office Box 62
Oak Ridge, Tennessee 37831

International Copyright, © U.S. Department of Energy, 1992, under the provisions of the Universal Copyright Convention.
United States copyright is not asserted under the United States Copyright Law, Title 17, United States Code.

Vol. 17, No. 11
November 1992
ISSN: 0160-3604
CODEN: ERABDZ

Energy Research Abstracts

Coverage

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports and patent applications originated by the U.S. Department of Energy, its laboratories, energy centers, and contractors, as well as theses and conference papers and proceedings issued by these organizations in report form. Audiovisual materials, computer media (magnetic tapes, diskettes, etc.), and engineering drawings are included in this definition. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations, *provided* that the full text of the document has been received by OSTI. Foreign report information is obtained through the International Energy Agency's 14-nation Energy Technology Data Exchange, the International Atomic Energy Agency's International Nuclear Information System, or nation-to-nation agreements. The purpose of this publication is to announce documents produced or obtained by DOE that are not so readily available as journal articles, books, or patents. Please note that beginning with the January 1991 issue, *ERA* does not cover nonreport literature.

Scope

The scope of *ERA* encompasses DOE's research, development, demonstration, and technology programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

The citations presented in *ERA* are available for online searching as records within the Energy Science and Technology Database (EDB). The current-year records are available on the Integrated Technical Information System (ITIS).

Availability

DOE and DOE contractors who have OSTI deposit accounts can obtain *ERA* (regular issues and annual indexes) from the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, Attention: Information Services. For further information, call (615)576-8401. *ERA* is also available at authorized GPO Depository Libraries. (List is provided on the inside back cover.)

ERA (regular issues and annual indexes) is available to the public on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Managing Editor, Doris M. Henline
Technical Editor, Robert W. Rutkowski

Information Sources

The citations presented in *Energy Research Abstracts* are a subset of the worldwide energy information provided to the Office of Scientific and Technical Information (OSTI) through exchange agreements with foreign sources and through exchanges or contracts with U.S. organizations.

The **Energy Technology Data Exchange (ETDE)** was established by the International Energy Agency to promote cooperation among members in conducting appropriate energy-related research and development programs through the development of a formal central information sharing system. In accomplishing the objectives of the ETDE, members select, abstract, and index relevant research information published in their countries in accordance with Exchange standards. OSTI serves as the central receiving and processing center for this information, which it then disseminates to national centers in the participating countries. The following countries are currently members of the ETDE:

Canada
Denmark
Finland
France
Federal Republic of Germany
Italy
Japan
The Netherlands
Norway
Spain
Sweden
Switzerland
United Kingdom
United States

The **International Nuclear Information System (INIS)** was established to promote the exchange of information on nuclear science and technology. Its operation is similar to that of the ETDE, with the INIS Secretariat being located in Vienna, Austria. Currently, 79 countries and 15 international organizations are members of INIS. OSTI serves as the INIS national center for the United States.

In the exercise of its rights and responsibilities under the agreements to which it is a party, the **Office of Scientific and Technical Information** both receives information from the above sources and submits U.S.-produced information to them. In addition to materials generated by the Department of Energy, this U.S.-produced information is gathered from other government agencies as well as under contract with private information processing companies. All input is computer processed and entered into a database for online retrieval. The database serves as well for the production of numerous OSTI publications.

How To Read A Citation

The principal data elements included in these citations are:

1. **Abstract number** within volume.
2. **Report number** identification for report-type literature.
3. **Title and subtitle** (non-English title may appear in parentheses, if applicable).
4. **Author(s).** First 10 names in the data record are printed, then "et al." is listed.
5. **Author affiliation.** Only first one is listed, in parentheses after author(s) to which it applies.
6. **Collaboration,** if present.
7. **Corporate author(s)** identifying corporation responsible for document.
8. **Date of publication.** If not known, a processing date is in brackets.
9. **Number of pages** or page range. Prices are based on total pages unless special pricing applies.
10. **Language** of document if non-English.
11. **Monograph title** if citation is an analytic (part, chapter, or paper) of a larger monograph.
12. **Sponsoring organization.**
13. **Contract or grant number.**
14. **Secondary identifying number;** may be a conference number.
15. **Conference title, location, and date,** if applicable.
16. **Order number.** The "DE" order number may be used for ordering from NTIS or OSTI, as appropriate. The "TI" prefix is valid only at OSTI.
17. **Sources of availability** from which a copy of the document may be obtained; usually appear as abbreviations. (See information on following page.)
18. **Drop note** or explanatory statement.
19. **Abstract.**
20. **Subject descriptors.** Listed only if no abstract or only a brief statement is included.

Sample Citations

Report ① ② ③

18494 (DOE/ER/40438–T1) **[Development of a hydrogen and deuterium polarized gas target for application in storage rings]:**
④ **Progress report.** Haeberli, W. Phys. VI collaboration. Wisconsin ⑥
Univ., Madison (USA). Dept. of Physics. [1989]. 12p. Sponsored by ⑫
⑦ DOE Energy Research. DOE Contract FG02-88ER40438. Order
Number DE89007246. Available from NTIS, PC A03/MF A01 - ⑬
⑯ OSTI; GPO Dep. ⑰

This paper briefly discusses the Wisconsin test facility for storage cells; results of target tests; the new UHV...

Report Analytic

⑨
18500 (INIS-SU—69, pp. 30-32) **Transition energies in Ne-like ions. Correlation effects.** Vainshtejn, L.A. AN SSSR, Moscow.
⑧ Fizicheskij Inst. 1988. (In Russian). In *Experimental and theoretical* ⑩
physics. Collection. Order Number DE89780060. Available from NTIS ⑪
(US Sales Only), PC A03/MF A01; INIS.

⑱ Kratkie Soobshcheniya po Fizike.; no. 6.

SILVER IONS/energy-level transitions; XENON IONS/energy-level transitions; CORRELATIONS; D STATES; E STATES;... ⑳

⑨
54 (DOE/ER/60888-1-Vol.1, pp. 115-117) **Investigation of air pollution in house due to use of various fuels.** Luo, Dayu (Chengdu ⑤
Sanitation (China)). Canada Mortgage and Housing Corp., Ottawa, ON
⑭ (Canada). 1990. (CONF-900724-Vol.1: Indoor Air '90: 5th international ⑮
conference on indoor air quality and climate, Toronto (Canada), 29 Jul - 3 aug 1990). In Indoor air '90: The fifth international conference on indoor air quality and climate. Volume 1: Final report. 786p. Order ⑨
Number DE90017786. Source: NTIS.

⑲ Air pollution in houses caused by combustion of coal is more serious than that by combustion of natural gas and methane (primarily by SO_2 and NO_2). The gas concentration after cooking is higher than that before cooking, and it is higher in kitchen than in bedroom and outdoor. There were mutations in the extract from TSP in $30m^2$ air in the bedroom, kitchen and outdoor, where coal and natural gas were used. The supernatant saliva activity of children whose family uses coal is significantly lower than that of pumping streams.

How To Order from the Availability Sources

TO OBTAIN A REPORT

Report literature, usually identified by an alphanumeric identifier at the beginning of a citation, is available from the sources listed in the citation (see example of element 2 on page iii). Often the sources are listed as abbreviations. Corresponding addresses are provided at right from which documents with these abbreviations may be ordered. When "OSTI" is given, **DOE and DOE contractors may order these documents from OSTI.** (However, check with your library or information organization which may require that orders go through them to OSTI.) OSTI prices are based on total pages unless special pricing applies. The public should order from NTIS or from one of the other agencies listed in the citation. NTIS price codes may continue to appear in some records. To expedite processing, an order form is provided in the back of this publication. NOTE: The order numbers provide quicker access for report ordering. Use the order number where possible.

GPO	Superintendent of Documents Government Printing Office Washington, DC 20402
GPO Dep.	Available for inspection or interlibrary loan at Government Printing Office regional depository libraries.
INIS	*Available only in microfiche.* INIS Clearinghouse International Atomic Energy Agency P.O. Box 100, A-1400 Vienna, Austria
NTIS	U.S. Department of Commerce National Technical Information Service 5285 Port Royal Road Springfield, VA 22161
OSTI	U.S. Department of Energy Office of Scientific and Technical Information P.O. Box 62 Oak Ridge, TN 37831
ESTSC	Energy Science and Technology Software Center P.O. Box 1020 Oak Ridge, TN 37831

How To Use the Indexes

Five indexes are provided for approaching the content of each issue of *Energy Research Abstracts*. Descriptions of entries in these indexes follow.

Corporate Author Index

The corporation, organization, or institution responsible for the issuance of the document is listed in this index. The entries are arranged alphabetically and provide the title and citation number of the reference. For example, the listing for the "Report" sample citation would appear as shown at right.

Wisconsin Univ., Madison (USA). Dept. of Physics
[Development of a hydrogen and deuterium polarized gas target for application in storage rings]: Progress report, 15:18494 (R;US)
Wisconsin Univ., Madison (USA). Lab. of Genetics
Organization of the R chromosome region in maize: Final progress report, June 1, 1983–May 31, 1986, 15:18255 (R;US)

Personal Author Index

Each author's name listed on a document cited in this issue is indexed. An index entry provides title and citation number; for secondary and other names, a cross-reference is given to the primary author name where the full index entry is located.

Hadley, D.L., *See* Lee, A.D., 15:17651
Haeberli, W., [Development of a hydrogen and deuterium polarized gas target for application in storage rings]: Progress report, 15:18494 (R;US)

Subject Index

This index lists the main subject descriptors assigned to each record by indexing professionals. A secondary or qualifier term is used where necessary to describe materials, objects, and processes. Document titles may be enhanced with additional informative phrases where necessary. An excerpt from this index appears at right.

HYDROGEN ISOTOPES
See also DEUTERIUM
HYDROGEN 4
TRITIUM
Neutron-Rich Isotopes
Study on the strong neutron-rich nuclei of lightest elements, 15:18686 (RA;SU;In Russian)

Contract Number Index

DOE technical reports are listed by contract number. Each entry also provides the primary corporation or organization cited for that contract number. A typical entry is shown.

FG02-88ER40438	**Wisconsin Univ., Madison (USA). Dept. of Physics** 15:18494 DOE/ER/40438–T1
FG02-88ER60664	**Rogers and Associates Engineering Corp., Salt Lake City, UT (USA)**

Report Number Index

Technical report literature is indexed by the alphanumerical identifier of the report. Patent documents and conferences are included for convenience. Each entry lists the citation number, the source of availability of the document, an indicator of presence at a GPO depository library, order number, and distribution category. A typical entry is:

DOE/ER/40438–
T1 15:18494 NTIS, OSTI E 1.99: DE89007246 MF-411

Subject Contents

The subject content of *Energy Research Abstracts* is arranged as shown below. The two-digit and four-digit category numbers printed here illustrate the category number assignment used in the database records.* The following list includes all of the 38 first-level and the 313 second-level categories. Because each issue of *ERA* publishes citations only for those documents announced during the past semimonthly period, some subject categories may not be present in every issue.

Numerical Listing of Categories

01		**COAL LIGNITE, AND PEAT**
	03	Preparation
	04	Processing
	05	Products and By-Products
	06	Properties and Composition
	08	Waste Management
	09	Environmental Aspects
	10	Reserves, Geology, and Exploration
	20	Mining
	30	Transport, Handling, and Storage
	40	Combustion
	50	Economic, Industrial, and Business Aspects
	60	Health and Safety
	70	Legislation and Regulations
02		**PETROLEUM**
	02	Reserves, Geology, and Exploration
	03	Drilling and Production
	04	Processing
	05	Products and By-Products
	06	Health and Safety
	07	Economic, Industrial, and Business Aspects
	08	Waste Management
	09	Environmental Aspects
	10	Legislation and Regulations
	20	Transport, Handling, and Storage
	30	Properties and Composition
	50	Combustion
03		**NATURAL GAS**
	02	Reserves, Geology, and Exploration
	03	Drilling, Production, and Processing
	04	Products and By-Products
	05	Health and Safety
	06	Economic, Industrial, and Business Aspects
	07	Waste Management
	08	Environmental Aspects
	10	Legislation and Regulations
	20	Transport, Handling, and Storage
	30	Properties and Composition
	40	Combustion
04		**OIL SHALES AND TAR SANDS**
	02	Reserves, Geology, and Exploration
	03	Drilling, Fracturing, and Mining
	04	Oil Production, Recovery, and Refining
	05	Properties and Composition
	06	Products and By-Products
	07	Health and Safety
	08	Economic, Industrial, and Business Aspects
	09	Waste Management
	10	Environmental Aspects
	20	Legislation and Regulations
	30	Transport, Handling, and Storage
	40	Combustion
05		**NUCLEAR FUELS**
	01	Reserves, Exploration, and Mining
	04	Feed Processing
	05	Uranium Enrichment
	07	Fuels Production and Properties
	08	Spent Fuels Reprocessing
	09	Transport, Handling, and Storage
	10	Economic, Industrial, and Business Aspects
	20	Waste Management
	30	Environmental Aspects
	40	Health and Safety
	50	Safeguards, Inspection, and Accountability
	60	Legislation and Regulations
07		**ISOTOPE AND RADIATION SOURCE TECHNOLOGY**
	01	Physical Isotope Separation
	02	Radiation Sources
	03	Isotopic Power Supplies
	04	Economic, Industrial, and Business Aspects
	05	Health and Safety
	06	Environmental Aspects
	07	Regulation and Licensing
08		**HYDROGEN**
	01	Production
	02	Storage, Transport, and Handling
	04	Economic, Industrial, and Business Aspects
	05	Health and Safety
	07	Products and By-Products
	08	Properties and Composition
	09	Environmental Aspects
	10	Waste Management
	20	Legislation and Regulations
	30	Combustion
09		**BIOMASS FUELS**
	07	Resources
	08	Production
	09	Processing
	10	Properties and Composition
	20	Combustion
	30	Economic, Industrial, and Business Aspects
	40	Transport, Handling, and Storage
	50	Environmental Aspects
	60	Health and Safety
	70	Legislation and Regulations
	80	Waste Management
	90	Products and By-Products

---

*The numerical subject category scheme is used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's data systems. Categories and definitions for the complete set of six-digit numbers are given in ETDE/PUB--1-R2, *International Energy: Subject Categories and Scope.*

10	**SYNTHETIC FUELS**
02	Production
03	Properties and Composition
04	Combustion
05	Transport, Handling, and Storage
06	Health and Safety
07	Economic, Industrial, and Business Aspects
08	Waste Management
09	Environmental Aspects
10	Legislation and Regulations
20	Products and By-Products

13	**HYDRO ENERGY**
01	Resources and Availability
02	Site Geology and Meteorology
03	Plant Design and Operation
04	Legislation and Regulations
05	Economic, Industrial, and Business Aspects
06	Environmental Aspects
07	Power-Conversion Systems
08	Health and Safety

14	**SOLAR ENERGY**
01	Resources and Availability
03	Economic, Industrial, and Business Aspects
04	Environmental Aspects
05	Solar Energy Conversion
06	Photovoltaic Power Systems
07	Solar Thermal Power Systems
08	Ocean Energy Systems
09	Solar Thermal Utilization
10	Solar Collectors and Concentrators
20	Heat Storage
30	Health and Safety
40	Legislation and Regulations

15	**GEOTHERMAL ENERGY**
01	Resources and Availability
02	Geology and Hydrology of Geothermal Systems
03	Geothermal Exploration and Exploration Technology
04	Legislation and Regulations
05	Economic, Industrial, and Business Aspects
06	Environmental Aspects
07	Products and By-Products
08	Geothermal Power Plants
09	Geothermal Engineering
10	Direct Energy Utilization
20	Geothermal Data and Theory
30	Health and Safety
40	Waste Management

16	**TIDAL AND WAVE POWER**
01	Resources and Availability
03	Legislation and Regulations
04	Economic, Industrial, and Business Aspects
05	Environmental Aspects
07	Tidal Power Plants
08	Wave Energy Converters
09	Health and Safety

17	**WIND ENERGY**
01	Resources and Availability (Climatology)
03	Legislation and Regulations
04	Economic, Industrial, and Business Aspects
05	Environmental Aspects
06	Wind Energy Engineering
07	Health and Safety

20	**FOSSIL-FUELED POWER PLANTS**
01	Power Plants and Power Generation
02	Waste Management
04	Health and Safety
05	Environmental Aspects
06	Economic, Industrial, and Business Aspects
07	Legislation and Regulations

21	**NUCLEAR POWER REACTORS AND ASSOCIATED PLANTS**
01	Power Reactors, Nonbreeding, Light-Water Moderated, Boiling Water Cooled
02	Power Reactors, Nonbreeding, Light-Water Moderated, Nonboiling Water Cooled
03	Power Reactors, Nonbreeding, Graphite Moderated
04	Power Reactors, Nonbreeding, Otherwise Moderated or Unmoderated
05	Power Reactors, Breeding
06	Power Reactors, Mobile, Propulsion, Package, and Transportable
07	Regulation and Licensing
08	Economics
09	Process Heat Reactors

22	**NUCLEAR REACTOR TECHNOLOGY**
01	Theory and Calculation
02	Components and Accessories
03	Fuel Elements
04	Control Systems
05	Environmental Aspects
06	Research, Test, Training, Production, Irradiation, Materials Testing Reactors
09	Reactor Safety

24	**POWER TRANSMISSION AND DISTRIBUTION**
01	Power Systems
02	Power System Networks, Transmission and Distribution
03	Power Transmission Lines and Cables
04	Health and Safety
05	Environmental Aspects
06	Legislation and Regulations
04	Economic, Industrial, and Business Aspects

25	**ENERGY STORAGE**
01	Magnetic
02	Compressed and Liquefied Gas
04	Capacitor Banks
05	Flywheels
06	Thermal
08	Chemical
09	Batteries
10	Economic, Industrial, and Business Aspects
20	Health and Safety
30	Environmental Aspects
40	Legislation and Regulations

29	**ENERGY PLANNING AND POLICY**
01	Energy Analysis and Modeling
02	Economics and Sociology
03	Environment, Health, and Safety
04	Energy Resources
05	Research, Development, Demonstration, and Commercialization
06	Nuclear Energy
07	Transport and Storage

	08	Heat Utilization
	10	Conservation
	20	Supply, Demand, and Forecasting
	30	Policy, Legislation, and Regulation
	40	Fossil Fuels
	50	Hydrogen and Synthetic Fuels
	60	Electric Power
	80	Consumption and Utilization
	90	Unconventional Sources and Power Generation
30		**DIRECT ENERGY CONVERSION**
	01	MHD Generators
	02	EHD Generators
	03	Thermoelectric Generators
	04	Thermionic Converters
	05	Fuel Cells
	08	Miscellaneous Converters
32		**ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION**
	01	Buildings
	02	Transportation
	03	Industrial and Agricultural Processes
	06	Municipalities and Community Systems
	09	Education and Public Relations
33		**ADVANCED PROPULSION SYSTEMS**
	01	Internal Combustion Engines
	02	External Combustion Engines
	03	Electric-Powered Systems
	04	Hybrid Systems
	05	Flywheel Propulsion
	06	Vehicle Design Factors
	07	Emission Control
	08	Alternative Fuels
35		**ARMS CONTROL**
	01	Policy, Negotiations, and Legislation
	02	Proliferation
	03	Verification
36		**MATERIALS**
	01	Metals and Alloys
	02	Ceramics, Cermets, and Refractories
	06	Other Materials
40		**CHEMISTRY**
	01	Analytical and Separations Chemistry
	02	Inorganic, Organic, and Physical Chemistry
	04	Electrochemistry
	05	Photochemistry
	06	Radiation Chemistry
	07	Radiochemistry and Nuclear Chemistry
	08	Combustion, Pyrolysis, and High-Temperature Chemistry
42		**ENGINEERING**
	02	Facilities, Equipment, and Techniques
	04	Heat Transfer and Fluid Flow
	05	Materials Testing
	10	Combustion Systems
	20	Mining and Underground Engineering
	30	Marine Engineering
	50	Power Cycles
	60	Components, Electron Devices and Circuits
	70	Nuclear Explosions
43		**PARTICLE ACCELERATORS**
	01	Design, Development, and Operation
	02	Beam Dynamics, Field Calculations, and Ion Optics
	03	Auxiliaries and Components
	04	Storage Rings
44		**INSTRUMENTATION**
	01	Radiation Instrumentation
	02	Radiation Effects on Instrument Components, Instruments, or Electronic Systems
	04	Well Logging Instrumentation
	05	Thermal Instrumentation
	06	Optical Instrumentation
	07	Geophysical and Meteorological Instrumentation
	08	Miscellaneous Instrumentation
45		**MILITARY TECHNOLOGY, WEAPONRY, AND NATIONAL DEFENSE**
	01	Chemical Explosions and Explosives
	02	Nuclear Explosions and Explosives
	03	Nuclear Explosion Detection
	04	Nuclear and Radiological Warfare
	05	Strategic Defense Initiative
	06	Chemical and Biological
54		**ENVIRONMENTAL SCIENCES**
	01	Environmental Sciences, Atmospheric
	02	Environmental Sciences, Terrestrial
	03	Environmental Sciences, Aquatic
55		**BIOMEDICAL SCIENCES, BASIC STUDIES**
	01	Behavioral Biology
	02	Biochemistry
	03	Cytology
	04	Genetics
	05	Metabolism
	06	Medicine
	07	Microbiology
	08	Morphology
	09	Pathology
	10	Physiological Systems
	20	Public Health
	30	Agriculture and Food Technology
56		**BIOMEDICAL SCIENCES, APPLIED STUDIES**
	01	Radiation Effects
	02	Thermal Effects
	03	Chemicals Metabolism and Toxicology
	04	Other Environmental Pollutant Effects
57		**HEALTH AND SAFETY**
	01	Real Accidents
58		**GEOSCIENCES**
66		**PHYSICS**
	10	General Physics
	11	Classical and Quantum Mechanics
	12	Techniques of General Use in Physics
	12-10	Cryogenics
	12-20	Particle Beam Production and Handling; Targets
	13	Other Aspects of Physical Science
	20	Physics of Elementary Particles and Fields
	21	General Theory of Particles and Fields
	22	Specific Theories and Interaction Models; Particle Systematics
	23	Specific Interactions, Decays and Processes

24	Properties of Specific Particles and Resonances
30	Nuclear Physics
31	Nuclear Structure
32	Radioactivity and Electromagnetic Transitions (Excluding Fission)
33	Nuclear Reactions and Scattering, General
34	Specific Nuclear Reactions and Scattering
35	Nuclear Mass Ranges
36	Radiation Physics
40	Atomic and Molecular Physics
41	Theory of Electronic Structure of Atoms and Molecules
42	Spectra of Atoms and Molecules and Their Interactions with Photons
43	Collision Phenomena
44	Experimentally Derived Information on Atomic and Molecular Properties
45	Special Atoms and Molecules
50	Physics of Condensed Matter
51	Nuclear Techniques in Condensed Matter Physics
52	Solid-State Plasma
53	Interactions Between Beams and Condensed Matter
54	Quantum Physics Aspects of Condensed Matter
54-10	Superconductivity
54-20	Superfluidity
54-30	Other Topics in Quantum Fluids and Solids
55	Direct Energy Conversion
70	**PLASMA PHYSICS AND FUSION**
03	Plasma Physics and Fusion Research
04	Fusion Technology
99	**GENERAL AND MISCELLANEOUS**
01	Management
02	Mathematics and Computers
03	Information Handling
04	Law

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

Alphabetical Listing of Categories

33	ADVANCED PROPULSION SYSTEMS
35	ARMS CONTROL
09	BIOMASS FUELS
56	BIOMEDICAL SCIENCES, APPLIED STUDIES
55	BIOMEDICAL SCIENCES, BASIC STUDIES
40	CHEMISTRY
01	COAL, LIGNITE, AND PEAT
30	DIRECT ENERGY CONVERSION
32	ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
29	ENERGY PLANNING AND POLICY
25	ENERGY STORAGE
42	ENGINEERING
54	ENVIRONMENTAL SCIENCES
20	FOSSIL-FUELED POWER PLANTS
99	GENERAL AND MISCELLANEOUS
58	GEOSCIENCES
15	GEOTHERMAL ENERGY
57	HEALTH AND SAFETY
13	HYDRO ENERGY
08	HYDROGEN
44	INSTRUMENTATION
07	ISOTOPE AND RADIATION SOURCE TECHNOLOGY
36	MATERIALS
45	MILITARY TECHNOLOGY, WEAPONRY, AND NATIONAL DEFENSE
03	NATURAL GAS
05	NUCLEAR FUELS
21	NUCLEAR POWER REACTORS AND ASSOCIATED PLANTS
22	NUCLEAR POWER TECHNOLOGY
04	OIL SHALES AND TAR SANDS
43	PARTICLE ACCELERATORS
02	PETROLEUM
66	PHYSICS
70	PLASMA PHYSICS AND FUSION
24	POWER TRANSMISSION AND DISTRIBUTION
14	SOLAR ENERGY
10	SYNTHETIC FUELS
16	TIDAL AND WAVE POWER
17	WIND ENERGY

Energy Research Abstracts

01 COAL, LIGNITE, AND PEAT

0103 Preparation

Refer also to citation(s) 30455, 30471, 30552, 30554, 31070, 32538, 32539

30419 (ANL/EAIS/TM-39, pp. 211-275) **Technology descriptions and demonstrations.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

A description of each technology and the demonstration programs pursuing it are given for the following clean coal technologies: two-stage froth flotation, coal-water mixtures, slagging combustors, integrated-gasification combined-cycle system, atmospheric fluidized-bed combustion. pressurized fluidized-bed combustion, limestone-injection multistage-burner combustion, gas-reburning sorbent-injection technology, Noxso Process, Danish spray-dryer flue gas desulfurization, dual-alkali flue gas desulfurization, and selective catalytic reduction.

30420 (DOE/FE-0242P(12/91)) **Comprehensive report to Congress: Proposals received in response to the Clean Coal Technology IV Program Opportunity Notice.** USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States). Dec 1991. 79p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92040428. Source: OSTI; NTIS; GPO Dep.

This report is a comprehensive overview of all proposals received and the projects selected in response to the Program Opportunity Notice for Clean Coal Technology IV Demonstration Projects (solicitation number DE-PSO1-91FE62271). The Department of Energy issued the solicitation on January 17, 1991. Through this PON, DOE solicited proposals to conduct cost shared clean coal technology projects to demonstrate innovative, energy efficient, economically competitive technologies. These technologies must be capable of (1) retrofitting, repowering or replacing existing facilities while achieving significant reductions in the emissions of sulfur dioxide (SO_2) and/or the oxides of nitrogen (NO_x) and/or (2) providing for future energy needs in an environmentally acceptable manner. The CCT-IV PON was the fourth in a series of five solicitations being conducted by DOE as part of the CCT Program. This is a technology development program jointly funded by government and industry. It will take the best and most promising of the advanced clean coal technologies and, over the next decade, will move them into the commercial marketplace through demonstration. These demonstrations will be at a scale large enough to generate the data (from design, construction, and operation) necessary for the private sector to judge their commercial potential and to make informed commercial decisions.

30421 (DOE/MC/11076-92/C0041) **The production of a premium solid fuel from Powder River Basin coal.** Merriam, N.; Sethi, V.; Thomas, K.; Grimes, R.W. Western Research Inst., Laramie, WY (United States). [1992]. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-86MC11076. (CONF-9205107-1: COAL PREP '92: 9th international coal preparation exhibition and conference, Cincinnati, OH (United States), 3-7 May 1992). Order Number DE92019176. Source: OSTI; NTIS; GPO Dep.

This report describes our initial evaluation of a process designed to produce premium-quality solid fuel from Powder River Basin (PRB) coal. The process is based upon our experience gained by producing highly-reactive, high-heating-value char as part of a mild-gasification project. In the process, char containing 20 to 25 wt % volatiles and having a gross heating value of 12,500 to 13,000 Btu/lb is produced. The char is then contacted by coal-derived liquid. The result is a deposit of 6 to 8 wt % pitch on the char particles. The lower boiling component of the coal-derived liquid which is not deposited on the char is burned as fuel. Our economic evaluation shows the process will be economically attractive if the product can be sold for about $20/ton or more. Our preliminary tests show that we can deposit pitch on to the char, and the product is less dusty, less susceptible to readsorption of moisture, and has reduced susceptibility to self heating.

30422 (DOE/PC/89758-T2, pp. 13, Paper 1) **Cyclic voltammetric study.** Utah Univ., Salt Lake City, UT (United States). [1990]. In *Surface electrochemical control for fine coal and pyrite separation. Technical progress report, October 1-December 31, 1990.* 56p. Order Number DE91008951. Source: OSTI; NTIS.

In previous studies the cyclic voltammetry measurements were limited to alkaline medium (borate/sulfate solutions of pH 7.9-10.5). Considering that the subsequent flotation process may be conducted in acid medium, the study of solution pH has been extended from the alkaline to the acidic region. The results are summarized and compared with the previous result at a pH of 9.2. Cyclic voltammograms of two coal pyrite samples, Pittsburgh No.8 and Upper Freeport were reported previously. An additional coal pyrite sample, Illinois No.6 has been examined and is compared with the former two coal pyrites and with mineral pyrite.

30423 (DOE/PC/89758-T2, pp. 11, Paper 2) **The floatability of mineral and coal pyrite.** Utah Univ., Salt Lake City, UT (United States). [1990]. In *Surface electrochemical control for fine coal and pyrite separation. Technical progress report, October 1-December 31, 1990.* 56p. Order Number DE91008951. Source: OSTI; NTIS.

As discussed in previous quarterly progress reports the desulfurization of coal could be accomplished either by floating pyrite from coal or floating pyrite from coal or floating coal from pyrite. It is desirable to float the minority component, pyrite, for the coal. Floatability tests of Colorado mineral pyrite, Pittsburgh No. 8 coal pyrite and Pittsburgh No. 8 coal with xanthate as collector were performed under the following conditions: (1) natural conditions (2) pre-treatment of the surface with acids, and (3) by stirring at high solid content and high temperatures. Some improvement in experiment techniques and equipment have been made in order to promote the accuracy and reproducibility of the test results. Results to date are given.

30424 (DOE/PC/89758-T2, pp. 23, Paper 3) **Electrochemical and flotation experiments involving particulate mineral and coal pyrite.** Utah Univ., Salt Lake City, UT (United States). [1990]. In *Surface electrochemical control for fine coal and pyrite separation. Technical progress report, October 1-December 31, 1990.* 56p. Order Number DE91008951. Source: OSTI; NTIS.

An electrochemical cell has been developed to study the electrochemistry of particulate mineral and coal pyrite and test methods of electrochemically modifying the pyrite surface chemistry to enhance or reduce natural floatability. The object of these initial experiments was to establish whether it was possible to execute electrochemical experiments on particulate beds secondly, to correlate the behavior of the particle beds with the established electrochemical properties of solid mineral and coal pyrite. In addition, the electrochemical cell was equipped with a Hallimond tube to simultaneously establish the floatability of the pyrite. Results to date are given.

30425 (DOE/PC/90308-6) **A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991-February 28, 1992.** Suuberg, E.M. Brown Univ., Providence, RI (United States). Div. of Engineering. [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90308. Order Number DE92019708. Source: OSTI; NTIS; GPO Dep.

The possibility that coal holds a significant portion of its moisture by solvent swelling mechanisms leads to an interesting technical issue. It is well known that simple drying of low rank coals at minemouth is ineffective because the process is reversible, to a significant degree. The economic advantages of pre-shipment drying have however dictated a search for "permanent" drying procedures. These have been developed by largely empirical means, and involve mild pyrolytic treatments of the coals in oil, steam or liquid water itself. The idea has always been to pyrolytically remove oxygen groups, which are assumed to be those that hold water most strongly by hydrogen bonding. The treatments have been designed to minimize tar formation and decrepitation of the particles, both highly undesirable. In relation to the present new hypothesis concerning water retention, it is likely that a sound approach to permanent drying would involve highly crosslinking the coal at mild drying conditions. The crosslinked coal could not swell sufficiently to hold much water. It is identifying processes to achieve this goal, that constitute the objective of the second phase of this work.

30426 (DOE/PC/91334–T55) **Carbonation as a binding mechanism for coal/calcium hydroxide pellets: Technical report, December 1, 1991–February 29, 1992.** Rapp, D.M. Ehrlinger, H.P. (Illinois State Geological Survey, Champaign, IL (United States)); Hackley, K.C.; Lytle, J.M.; Moran, D.L.; Berger, R.L.; Schanche, G.; Chow, Poo; Strickland, R. Illinois State Geological Survey, Champaign, IL (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States); Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States). DOE Contract FG22-91PC91334. Order Number DE92018294. Source: OSTI; NTIS; GPO Dep.

In this project supported by the CRSC, the Tennessee Valley Authority (TVA) and the Engineering Research Laboratory (CERL), ISGS is investigating the pelletization of fine coal with calcium hydroxide, a sulfur capturing sorbent. The objective is to produce a readily-transportable fuel which will burn in compliance with the recently passed Clean Air Act Amendments. To improve the economics of pelletization, carbonation, or, the reaction of carbon dioxide with calcium hydroxide to produce a binding matrix of calcium carbonate, is being investigated as a method of hardening pelletized coal fines. Previous results indicate that carbonation significantly improves pellet quality including serving to weatherproof the pellets. During this quarter, work was conducted on several topics. Calcium oxide was investigated as a potentially lower cost binder than calcium hydroxide and was determined to be of comparable effectiveness on a molar basis indicating some potential for an overall cost savings. The effect of pellet size on pellet quality was also investigated. Results indicate that 1/4 and 1/2-inch diameter pellets have similar compressive strengths when compared on the basis of pounds per square inch crushing pressure. Also a low cost starch was tested as an alternative binder. Although cheaper per pound than a starch binder previously tested, it was not less expensive when evaluated on the basis of pellet quality attained.

30427 (DOE/PETC/TR–92/11) **Performance evaluation of micronized-magnetite cycloning at high relative densities of separation.** Klima, M.S.; Killmeyer, R.P. USDOE Pittsburgh Energy Technology Center, PA (United States). Coal Preparation Div. Jun 1992. 32p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019276. Source: OSTI; NTIS; GPO Dep.

In 1991, eight laboratory-scale micronized-magnetite (-10 μm) cyclone tests were carried out at the US Department of Energy's (DOE) Pittsburgh Energy Technology Center (PETC) to investigate the performance of this process in cleaning 600 × 38-μm coal. Previous testing was done in the same 76-mm-diameter cyclone at a low relative density of the medium (1.30), whereas these tests were all conducted at a relative density of the medium of 1.50. The effects of inlet pressure, magnetite particle size, medium-to-coal ratio, and remanent magnetization of the dense-medium solids on cyclone separation efficiency were studied. The performance was analyzed in terms of both distribution curves and ash and pyritic sulfur values. The results demonstrated that micronized-magnetite cycloning can still achieve good separations down to as fine as 38 μm with correspondingly good reductions in both ash and pyritic sulfur content even at the higher relative density. This report provides the detailed cyclone data for this series of follow-up tests.

0104 Processing

Refer also to citation(s) 30419, 30554, 31070, 31071, 31296

30428 (CONF-920444–32) **Heteropolyanions: Soluble precatalysts for quinoline hydrogenation.** Hoppe, M.L.; Koo, Sang-Man; Ryan, D.; Laine, R.M. Michigan Univ., Ann Arbor, MI (United States). [1992]. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90313. From American Chemical Society national meeting; San Francisco, CA (United States); 5-10 Apr 1992. Order Number DE92018500. Source: OSTI; NTIS; GPO Dep.

Initial efforts to evaluate heteropolyanions as potential precatalysts for quinoline hydrogenation are described. Reaction parameters are developed that define a baseline for quinoline hydrogenation to tetrahydroquinoline through exploration of the effects of variations in temperature, $H_{2pressure}$, catalyst and quinoline concentrations on the catalytic activity.

30429 (CONF-920444–33) **Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of $Ru_3(CO)_{12}$ (or $RuCl_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline.** Koo, Sang-Man; Ryan, D.; Laine, R.M. Michigan Univ., Ann Arbor, MI (United States). [1992]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90313. From American Chemical Society national meeting; San Francisco, CA (United States); 5-10 Apr 1992. Order Number DE92018950. Source: OSTI; NTIS; GPO Dep.

Efforts have been made to develop Ru/Mo bimetallic catalyst systems for hydrodenitrogenation (HDN) of tetrahydroquinoline (THQ)- In the course of these studies, it was discovered that in ethanol, under H_2 and in the presence Of CS2, Precatalyst solutions containing Ru [as Ru_3 $(CO)_{12}$ or $RuCl_3$] and Mo [as the $H_3PMO_{12}0_{40}$ heteropolyanion (HPA)] decompose to form bimetallic, sulfided particles. Particle diameters run from 0.1 to 5 μm depending on the rate of stirring. Catalyst particles with sizes ranging from 0.1–1 μm can be prepared reproducibly. BET measured surface areas for these size particles ranged from 2 to 20 m2/g. These sulfided particles were found to catalyze, at temperatures of 200–250°C and hydrogen pressures of 200–1000 psig H_2, the N-ethylation of THQ to form NEt-THQ; rather than the formation of propylcyclohexane or propylbenzene, reaction products expected for HDN of THQ. Monometallic heterogeneous catalysts prepared from the individual precatalyst complexes, under identical conditions, show minimal activity for N-ethylation by comparison with the bimetallic catalyst. In the absence of H_2, the reaction proceeds such that THQ is converted to Q, N-EtTHQ, N-C_6H_9-THQ, and N-C_6H_{13}-THQ. The latter products appear to arise via acetaldehyde, formed as an intermediate by dehydrogenation of ethanol. Acetaldehyde either condenses with THQ to form N-Et-THQ, or self condenses (aldol condensation) prior to reaction with THQ thereby giving higher homolog alkylation products.

30430 (CONF-920444–34) **Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst.** Huang, Lili; Song, Chunshan; Schobert, H.H. Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering. [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91042. From American Chemical Society national meeting; San Francisco, CA (United States); 5-10 Apr 1992. Order Number DE92019555. Source: OSTI; NTIS; GPO Dep.

In the presence of catalyst, the specific reaction conditions have a direct effect on conversion in coal liquefaction and on the product distribution. At temperatures lower than 300°C, catalyst precursors such as ammonium tetrathiomolybdate may not be converted to a catalytically active form and thus have no benefit on liquefaction. However, at severe reaction conditions, such as high temperature, retrogressive reactions will take place, and crosslinking or recombination of radicals generated in thermal cracking will reduce the possibility of breaking the coal macromolecule into smaller molecules. In an effort to achieve highest conversion and desired product distribution, low-severity processes have been studied by several research groups. It has been found that temperature-programmed and temperature-staged liquefaction are, efficient to maximize the the retrogressive reactions. The objective of the work reported in this paper is to study the catalytic effect of ammonium tetrathiomolybdate, techniques to disperse this catalyst precursor onto coal, and the optimum reaction conditions for the highest conversion.

30431 (CONF-920444-35) **Temperature-programmed liquefaction of low-rank coals in H-donor and non-donor solvents.** Song, Chunshan; Schobert, H.H. Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering. [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91042. From American Chemical Society national meeting; San Francisco, CA (United States); 5-10 Apr 1992. Order Number DE92019554. Source: OSTI; NTIS; GPO Dep.

Comparative examination between the TPL and N-PL runs using different solvents established that the beneficial effects of temperature-programming in tetralin are not due to thermal treatment but are closely associated with low temperature hydrogen-transfer during programmed heat-up. Although H-transfer is a chemical process, both the physical and chemical mechanisms can be responsible for the desirable effects of TPL as compared to N-PL in tetralin. Our initial idea in designing the temperature program was to meet the physical as well as chemical requirements for conversion of coals which are macromolecular in chemical nature but are microporous in physical nature. The rationale of selecting a low temperature soak is associated with the characteristics of coal pore structure. The chemically beneficial effect of TPL compared to N-PL in H-donor lies in the programmed heat-up. The H-transfer from H-donor could stabilize the thermally derived radicals are thermally sensitive groups. Because of the bond dissociation energy distribution, one could selectively break certain bonds at certain temperature range by using temperature programming, which would provide time for radical to abstract H from H-donor. Low-rank coals are characterized by low aromaticities and high oxygen functionalities. It seems possible from comparative examination of the coal conversion data that the TPL conditions may facility the reduction of crosslinking reactions of the thermally sensitive groups such as oxygen-functional groups at low temperatures in H-donor. Both the present and previous results strongly suggest erg very fast heating would result in too fast a thermal fragmentation of low-rank coals at high temperatures to be balanced by H-donation, which consequently leads to enhanced retrogressive reactions.

30432 (DOE/MC/23075-2974, pp. 10-129) **Submodel development and evaluation.** Advanced Fuel Research, Inc., East Hartford, CT (United States); Brigham Young Univ., Provo, UT (United States). Jan 1991. In *Measurement and modeling of advanced coal conversion processes. Annual report, October 1989–September 1990.* 224p. Order Number DE91002056. Source: OSTI; NTIS.

The objectives of this task are to develop or adapt advanced physics and chemistry submodels for the reactions of coal in an entrained-bed and a fixed-bed reactor and to validate the submodels by comparison with laboratory scale experiments. The development of advanced submodels for the entrained-bed and fixed-bed reactor models will be organized into the following categories: (a) Coal Chemistry (including coal pyrolysis chemistry, char formation, particle mass transfer, particle thermal properties, and particle physical behavior); (b) Char Reaction Chemistry at high pressure; (c) Secondary Reactions of Pyrolysis Products (including gas-phase cracking, soot formation, ignition char burnout, sulfur capture, and tar/gas reactions); (d) Ash Physics and Chemistry (including mineral characterization, evolution of volatile, molten and dry particle components, and ash fusion behavior); (e) Large Coal Particle Effects (including temperature, composition, and pressure gradients and secondary reactions within the particle, and the physical effects of melting, agglomeration, bubble formation and bubble transport); (f) Large Char Particle Effects (including oxidation); (g) SO$_x$-NO$_x$ Submodel Development (including the evolution and oxidation of sulfur and nitrogen species); and (h) SO$_x$ and NO$_x$ Model Evaluation. Results to date are discussed.

30433 (DOE/MC/23075-2974, pp. 130-183) **Comprehensive model development and evaluation.** Advanced Fuel Research, Inc., East Hartford, CT (United States); Brigham Young Univ., Provo, UT (United States). Jan 1991. In *Measurement and modeling of advanced coal conversion processes. Annual report, October 1989–September 1990.* 224p. Order Number DE91002056. Source: OSTI; NTIS.

The objective of this task is to integrate advanced chemistry and physics submodels into a comprehensive two-dimensional model of entrained-flow reactors (PCGC-2) and to evaluate the model comparing with data from well-documented experiments. Approaches for the comprehensive modeling of fixed-bed reactors will also be reviewed and evaluated and an initial framework for a comprehensive fixed-bed code will be employed after submission of a detailed test plan. This task is being performed in three subtasks. The first covers the full 60 months of the program and is devoted to the development of the entrained-bed code. The second subtask is for fixed-bed reactors and is divided into two parts. The first part (12 months) was devoted to reviewing the state-of-the-art in fixed-bed reactors. This led to the development of the research plan for fixed-bed reactors, which was approved. The code development is being done in the remaining 45 months of the program. The third subtask is to generalize the entrained-bed code to fuels other than dry pulverized coal and will be performed during the last 24 months of the program. Results to date are discussed.

30434 (DOE/MC/23075-2974, pp. 184-198) **Application of integrated codes.** Advanced Fuel Research, Inc., East Hartford, CT (United States); Brigham Young Univ., Provo, UT (United States). Jan 1991. In *Measurement and modeling of advanced coal conversion processes. Annual report, October 1989–September 1990.* 224p. Order Number DE91002056. Source: OSTI; NTIS.

The objectives of this task are to evaluate the integrated comprehensive codes for pulverized coal and fixed-bed reactors and to apply the codes to selected cases of interest to METC. This task will be accomplished in two subtasks, one for the entrained-bed lasting 45 months and one for the fixed-bed lasting 36 months. Each of these subtasks will consists of three components: (1) Simulation of demonstration cases on BYU computers; (2) Implementation on a work station at AFR; and (3) Simulation of demonstration cases on the workstation. Results to date are discussed.

30435 (DOE/MC/23286-3093) **Cleavage and crosslinking of polymeric coal structures during pyrolysis: Final report.** McMillen, D.F.; Malhotra, R. SRI International, Menlo Park, CA (United States). Molecular Physics Lab. Feb 1992. 59p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-87MC23286. Order Number DE92001281. Source: OSTI; NTIS; GPO Dep.

The ultimate objective of this project was to develop a better understanding of volatiles production to help optimize the yield and character of condensable coproducts during coal pyrolysis or mild gasification. The specific objectives were to (1) Develop pyrolysis procedures that minimize secondary reactions; and (2) Develop coal pretreatments that current knowledge suggests will prorate bond scission or prevent retrograde reactions. Our approach was to study the pyrolysis of coals and tar-loaded coals by using several techniques that span a range of heating rates and pressures. Slow-heating pyrolyses were performed at low pressures in the inlet of a field ionization mass spectrometer and at atmospheric pressures in a thermogravimetric analyzer. Moderately rapid-heating pyrolyses were performed in a vacuum TGA apparatus and in sealed silica ampules heated in a molten-salt bath. The fastest heating rates were achieved with laser pyrolysis at about 30,000 X/s. The high tar yield seen in this work where the entire volume of the coal particle becomes hot and fluid at very nearly the same time, taken together with the evident non-vapor transport of the tar under these conditions, emphasizes the importance of better understanding the development of fluidity during coal heating. This specifically includes the profound effects–long-recognized but poorly understood that mild oxidation has in suppressing coal fluidity. It also includes the more recently recognized fact that heating in the presence of an inert gas produced substantially greater fluidity than does heating in the presence of combustion gases, even if the conditions are very fuel rich and all the oxygen itself has already been consumed when the coal particles are encountered.

30436 (DOE/MC/27225-T5) **Biological conversion of synthesis gas: Project status report, January 1, 1992–March 31,**

1992. Arkansas Univ., Fayetteville, AR (United States). Coll. of Engineering. 1 Apr 1992. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG21-90MC27225. Order Number DE92017673. Source: OSTI; NTIS; GPO Dep.

The anaerobic, photosynthetic bacterium Rhodospirillum rubrum has been chosen for catalysis of the biological water gas shift reaction. In addition, two other anaerobic, photosynthetic bacteria, Chlorobium thiosulfatophilum and Chlorobium phaeobacteroides, have been evaluated as candidates for H_2S conversion to elemental sulfur. Growth and H_2S uptake studies in the presence of basal medium indicated that C. thiosulfatophilum is a much superior organism. C. phaeobacteroides showed sporatic growth at best, with growth always slower than C. thiosulfatophilum. Also, when C. phaeobacteroides experienced slow growth, no H_2S consumption was observed. C. thiosulfatophilum always showed superior growth and H_2S uptake, and thus will be selected as the bacterium for H_2S conversion to elemental sulfur.

30437 (DOE/PC/89767–T5) **Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991.** Pfefferle, L.D. Yale Univ., New Haven, CT (United States). Dept. of Chemical Engineering. [1991]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89767. Order Number DE92018880. Source: OSTI; NTIS; GPO Dep.

In the second project year, we are concentrating on the pyrolysis of C_6 and C_7 compounds starting with cyclohexane benzene and toluene in order to develop the VUV-MS technique for compounds more representative of those in coal pyrolysis applications. In the first two quarters of the current project year, we have carried out the pyrolysis and oxidative pyrolysis of cyclohexane and toluene and mixtures of these compounds in a microflow reactor. Figures 1 and 2 show mass spectra for cyclohexane pyrolysis and cyclohexane/toluene pyrolysis at 1400 K and 2 ms residence time. The first step in cyclohexane pyrolysis is ring rupture to hexane. The hexane goes through rapid decomposition or, in the case of the hexane/toluene mixture, is also depleted by methyl addition to ultimately form mass 100. The methyl and methane radicals are formed through toluene pyrolysis to phenyl and methyl radicals. Thus mixture data yields insight into pyrolysis of pure compounds because you can titrate species that either are the same mass as the parent fuel or that are important mechanistically but never reach high steady-state concentrations. Mixture data also provides cross checks on species calibrations through reaction rate analysis. Figures 3 and 4 show mass spectra taken during the oxidative pyrolysis of cyclohexane and cyclohexane/toluene for the same conditions as Figures 1 and 2. Note that for these oxidative pyrolysis conditions an important pathway for toluene loss is a reaction with oxygen to form benzaldehyde.

30438 (DOE/PC/89772–T12) **Applications of micellar enzymology to clean coal technology: Tenth quarterly report.** Walsh, C.T. Boston Univ., MA (United States). School of Medicine. 29 Apr 1992. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89772. Order Number DE92016632. Source: OSTI; NTIS; GPO; GPO Dep.

Full implementation of coal fuel sources will require more effective methods of providing "clean coal" as a fuel source. Methods must be developed to reduce the sulfur content of coal which significantly contributes to environmental pollution. This project is designed to develop methods for pre-combustion coal remediation by implementing recent advances in enzyme biochemistry. The novel approach of this study is incorporation of hydrophilic oxidative enzymes in reverse micelles in an organic solvent. Enzymes from commercial sources or microbial extracts are being investigated for their capacity to remove organic sulfur from coal by oxidation of the sulfur groups, splitting of C-S bonds and loss of sulfur as sulfuric acid. Dibenzothiophene (DBT) and ethylphenylsulfide (EPS) are serving as models of organic sulfur-containing components of coal in initial studies.

30439 (DOE/PC/89773–T1) **Coal plasticity at high heating rates and temperatures: First technical progress report for the fourth quarter 1989.** Darivakis, G.S.; Peters, W.A.; Howard, J.B. Massachusetts Inst. of Tech., Cambridge, MA (United States). Jan 1990. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89773. Order Number DE92019523. Source: OSTI; NTIS; GPO Dep.

The broad objective of this project is to obtain improved, quantitative understanding of the transient plasticity of bituminous coals under high heating rates and other reaction and pretreatment conditions of scientific and practical interest. To these ends the research plan is to measure the softening and resolidification behavior of two US bituminous coals with a rapid-heating, fast response, high-temperature coal plastometer, previously developed in this laboratory. Specific measurements planned for the project include determinations of apparent viscosity, softening temperature, plastic period, and resolidificationtime for molten coal: (1) as a function of independent variations in coal type, heating rate, final temperature, gaseous atmosphere (inert, 0_2 or H_2), and shear rate; and (2) in exploratory runs where coal is pretreated (preoxidation, pyridine extraction, metaplast cracking agents), before heating. The intra-coal inventory and molecular weight distribution of pyridine extractables will also be measured using a rapid quenching, electrical screen heater coal pyrolysis reactor. The yield of extractables is representative of the intra-coal inventory of plasticing agent (metaplast) remaining after quenching. Coal plasticity kinetics will then be mathematically modeled from metaplast generation and depletion rates, via a correlation between the viscosity of a suspension and the concentration of deformable medium (here metaplast) in that suspension. Work during this reporting period has been concerned with re-commissioning the rapid heating rate plastometer apparatus.

30440 (DOE/PC/89773–T2) **Coal plasticity at high heating rates and temperatures: Second technical progress report for the third quarter 1990.** Gerjarusak, S.; Peters, W.A; Howard, J.B. Massachusetts Inst. of Tech., Cambridge, MA (United States). Dec 1990. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89773. Order Number DE92019524. Source: OSTI; NTIS; GPO Dep.

The rapid-heating, fast response plastometer has been reassembled and restored to its working condition. The plastometer was calibrated with various viscosity standards. The ratio of the observed viscosity to the actual viscosity was found to range from 1.2 to 2.8. The higher observed viscosity values were attributed to friction and misalignment of the shearing disk. In addition, the viscosity readings varied from one run to another because the distance between the moving disk and the stationary plate could not be maintained constant. Use of a low friction bearing for the shearing disk's shaft and the cone-and-plate configuration have been suggested as remedies to these problems.

30441 (DOE/PC/89857–T1) **[Direct coal liquefaction baseline design and system analysis]: Quarterly status report, [December 23, 1991–March 15, 1992].** Bechtel, Inc., Houston, TX (United States); Amoco Corp., Chicago, IL (United States). 22 Jun 1992. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC89857. Order Number DE92018513. Source: OSTI; NTIS; GPO Dep.

The primary objective of the study is to develop a computer model for a base line direct coal liquefaction design based on two stage direct coupled catalytic reactors. This primary objective is to be accomplished by completing the following: a base line design based on previous DOE/PETC results from Wilsonville pilot plant and other engineering evaluations; a cost estimate and economic analysis; a computer model incorporating the above two steps over a wide range of capacities and selected process alternatives; a comprehensive training program for DOE/PETC Staff to understand and use the computer model; a thorough documentation of all underlying assumptions for baseline economics; and a user manual and training material which will facilitate updating of the model in the future.

30442 (DOE/PC/89857–T2) **Direct coal liquefaction baseline design and system analysis: Quarterly report, October–December 1991.** Bechtel, Inc., Houston, TX (United States); Amoco Corp., Chicago, IL (United States). Mar 1992. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC89857. Order Number DE92018514. Source: OSTI; NTIS; GPO Dep.

The primary objective of the study is to develop a computer model for a base line direct coal liquefaction design based on two stage direct coupled catalytic reactors. This primary objective is to be accomplished by completing the following: a base line design based on previous DOE/PETC results from Wilsonville pilot plant and other engineering evaluations; a cost estimate and economic analysis; a computer model incorporating the above two steps over a wide range of capacities and selected process alternatives; a comprehensive training program for DOE/PETC Staff to understand and use the computer model; a thorough documentation of all underlying assumptions for baseline economics; and a user manual and training material which will facilitate updating of the model in the future.

30443 (DOE/PC/89857–T4) **Direct coal liquefaction baseline design and system analysis: Quarterly report, April–June 1991.** Bechtel, Inc., Houston, TX (United States); Amoco Corp., Chicago, IL (United States). Jul 1991. 160p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC89857. Order Number DE92018512. Source: OSTI; NTIS; GPO Dep.

The primary objective of the study is to develop a computer model for a base line direct coal liquefaction design based on two stage direct coupled catalytic reactors. This primary objective is to be accomplished by completing the following: a base line design based on previous DOE/PETC results from Wilsonville pilot plant and other engineering evaluations; a cost estimate and economic analysis; a computer model incorporating the above two steps over a wide range of capacities and selected process alternatives; a comprehensive training program for DOE/PETC Staff to understand and use the computer model; a thorough documentation of all underlying assumptions for baseline economics; and a user manual and training material which will facilitate updating of the model in the future.

30444 (DOE/PC/89857–T5) **Direct coal liquefaction baseline design and system analysis: Quarterly report, January–March 1991.** Bechtel, Inc., Houston, TX (United States); Amoco Corp., Chicago, IL (United States). Apr 1991. 154p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC89857. Order Number DE92018511. Source: OSTI; NTIS; GPO Dep.

The primary objective of the study is to develop a computer model for a base line direct coal liquefaction design based on two stage direct coupled catalytic reactors. This primary objective is to be accomplished by completing the following: a base line design based on previous DOE/PETC results from Wilsonville pilot plant and other engineering evaluations; a cost estimate and economic analysis; a computer model incorporating the above two steps over a wide range of capacities and selected process alternatives; a comprehensive training program for DOE/PETC Staff to understand and use the computer model; a thorough documentation of all underlying assumptions for baseline economics; and a user manual and training material which will facilitate updating of the model in the future.

30445 (DOE/PC/89857–T6) **Direct coal liquefaction baseline design and system analysis: Quarterly report, September–December 1990.** Bechtel, Inc., Houston, TX (United States); Amoco Corp., Chicago, IL (United States). Jan 1991. 150p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC89857. Order Number DE92018510. Source: OSTI; NTIS; GPO Dep.

The primary objective of the study is to develop a computer model for a base line direct coal liquefaction design based on two stage direct coupled catalytic reactors. This primary objective is to be accomplished by completing the following: a base line design based on previous DOE/PETC results from Wilsonville pilot plant and other engineering evaluations; a cost estimate and economic analysis; a computer model incorporating the above two steps over a wide range of capacities and selected process alternatives; a comprehensive training program for DOE/PETC Staff to understand and use the computer model; a thorough documentation of all underlying assumptions for baseline economics; and a user manual and training material which will facilitate updating of the model in the future.

30446 (DOE/PC/89857–T7) **Direct coal liquefaction baseline design and system analysis: Quarterly report, May–August 1990.** Bechtel, Inc., Houston, TX (United States); Amoco Corp., Chicago, IL (United States). Sep 1990. 76p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC89857. Order Number DE92018509. Source: OSTI; NTIS; GPO Dep.

The primary objective of the study is to develop a computer model for a base line direct coal liquefaction design based on two stage direct coupled catalytic reactors. This primary objective is to be accomplished by completing the following: a base line design based on previous DOE/PETC results from Wilsonville pilot plant and other engineering evaluations; a cost estimate and economic analysis; a computer model incorporating the above two steps over a wide range of capacities and selected process alternatives; a comprehensive training program for DOE/PETC Staff to understand and use the computer model; a thorough documentation of all underlying assumptions for baseline economics; and a user manual and training material which will facilitate updating of the model in the future.

30447 (DOE/PC/89881–T4) **Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991.** Sperl, P.L.; Sperl, G.T. Geo-Microbial Technologies, Inc., Ochelata, OK (United States). [1991]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89881. Order Number DE92019001. Source: OSTI; NTIS; GPO Dep.

We have defined critical areas for further study. These arise out of the basic nature of both the microorganisms and the nature of catalysts. Whereas other catalysts not employing Mo or W would probably be readily leached by T. ferrooxidans and denitrifiers, those which contain these two metals require special attention and highly tolerant strains of T. ferrooxidans but not the denitrifiers to be realistically treated microbiologically. The alternative is to develop methods for the continuous removal of Mo as it is removed from the catalyst. We have preliminary data that show this to be technically feasible. The following are areas which need detailed study: to increase the molybdate tolerance of T. ferrooxidans, and to employ the metabolic actions of other microorganisms which may be better adapted to metal tolerances and sulfide scavenging.

30448 (DOE/PC/89881–T5) **Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991.** Sperl, P.L.; Sperl, G.T. Geo-Microbial Technologies, Inc., Ochelata, OK (United States). [1991]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89881. Order Number DE92019002. Source: OSTI; NTIS; GPO Dep.

This project was initiated on October 1, 1989, for the purpose of recovering metals from spent coal liquefaction catalysts. Two catalyst types are the subject of the contract. The first is a Ni-Mo catalyst supported on alumina (Shell 324) as is used in a pilot scale coal liquefaction facility at Wilsonville, Alabama. A large sample of spent catalyst has been obtained. The second material is an unsupported ammonium molybdate catalyst used in a pilot process by the Department of energy at the Pittsburgh energy Technology Center. The object of the contract is to treat these spent catalysts with microorganisms, especially Thiobacillus ferrooxidans, but also other Thiobacillus sp. and possibly Sulfolobus, to leach and remove the metals (Ni and Mo) from the spent catalysts into a form which can be readily recovered by conventional techniques.

30449 (DOE/PC/89881–T6) **Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991.** Sperl, P.L.; Sperl, G.T. Geo-Microbial Technologies, Inc., Ochelata, OK (United States). [1991]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89881. Order Number DE92019003. Source: OSTI; NTIS; GPO Dep.

This project was initiated on October 1, 1989, for the purpose of recovering metals from spent coal liquefaction catalysts. Two catalyst types are the subject of the contract. The first is a Ni-Mo catalyst supported on alumina (Shell 324) as is used in a pilot scale coal liquefaction facility at Wilsonville, Alabama. This plant is run and operated by Southern Clean Fuels. A large sample of spent catalyst from this facility has been obtained. The second material is an unsupported ammonium molybdate catalyst used in a pilot process by the Department of Energy at the Pittsburgh Energy Technology Center. This material was obtained in late February 1990 but has not been pursued since the No content of this particular sample is too low for the current studies and no new catalyst has since been obtained. The object of the contract is to treat these spent catalysts with microorganisms, especially Thiobacillus ferrooxidans, but also other Thiobacillus sp. and possibly Sulfolobus, to leach and remove the metals (Ni and Mo) from the spent catalysts into a form which can be readily recovered by conventional techniques.

30450 (DOE/PC/89881–T7) **Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990.** Sperl, P.L.; Sperl, G.T. Geo-Microbial Technologies, Inc., Ochelata, OK (United States). [1990]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89881. Order Number DE92019004. Source: OSTI; NTIS; GPO Dep.

This project was initiated on October 1, 1989, for the purpose of recovering metals from spent coal liquefaction catalysts. Two catalyst types are the subject of the contract. The first is a Ni-Mo catalyst supported on alumina (Shell 324) as is used in a pilot scale coal liquefaction facility at Wilsonville, Alabama. The object of the contract is to treat these spent catalysts with microorganisms, especially Thiobacillus ferrooxidans, but also other Thiobacillus sp., to leach and remove the metals (Ni and Mo) from the spent catalysts into a form which can be readily recovered by conventional techniques.

30451 (DOE/PC/89881–T8) **Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990.** Sperl, P.L.; Sperl, G.T. Geo-Microbial Technologies, Inc., Ochelata, OK (United States). [1990]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89881. Order Number DE92019005. Source: OSTI; NTIS; GPO Dep.

This project was initiated on October 1, 1989, for the purpose of recovering metals from spent coal liquefaction catalysts. Two catalyst types are the subject of the contract. The first is a Ni-Mo catalyst supported on alumina (Shell 324) as is used in a pilot scale coal liquefaction facility at Wilsonville, Alabama. This plant is run and operated by Southern Clean Fuels. A large sample of spent catalyst from this facility has been obtained. The second material is an unsupported ammonium molybdate catalyst used in a pilot process by the Department of Energy at the Pittsburgh Energy Technology Center. This material was obtained in late February 1990 but has not been pursued since the No content of this particular sample is too low for the current studies. The object of the contract is to treat these spent catalysts with microorganisms, especially Thiobacillus ferrooxidans, but also other Thiobacillus sp. and possibly Sulfolobus, to leach and remove the metals (Ni and Mo) from the spent catalysts into a form which can be readily recovered by conventional techniques.

30452 (DOE/PC/90005–T59) **Liquid Phase Methanol LaPorte PDU: Modification, operation, and support studies: Quarterly technical progress report No. 4, 1 April–30 June 1988.** Brown, D.M. (Air Products and Chemicals, Inc., Allentown, PA (United States)); Frank, M.E. Air Products and Chemicals, Inc., Allentown, PA (United States); Chem Systems, Inc., Tarrytown, NY (United States). 10 Aug 1988. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-87PC90005. Order Number DE92019206. Source: OSTI; NTIS; GPO Dep.

To strengthen the data base of the Liquid Phase Methanol LaPorte technology, research is being conducted in parallel with the process development unit engineering and construction efforts. This work will address alternate liquid media studies, effects of CO_2 in CO-rich synthesis gas, optimization of in-situ catalyst reduction and storage, catalyst poison studies, fundamental kinetic modelling, testing alternate commercial catalysts, and field testing of new guard-bed materials for catalyst poisons. Tests will be performed primarily using CO-rich synthesis gas. (VC)

30453 (DOE/PC/90036–T4) **Synthesis of model compounds for coal liquefaction research: Quarterly report No. 1, June 21, 1990–September 20, 1990.** Hirschon, A.S.; Asaro, M.; Bottaro, J. SRI International, Menlo Park, CA (United States). 2 Nov 1990. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC90036. Order Number DE92018412. Source: OSTI; NTIS; GPO Dep.

The objectives of this project are to develop feasible synthetic routes to produce (1) 4(4'-hydroxy-5',6',7',8'-tetrahydro-l'-naphthylmethyl)- 6-methyldibenzothiophene, and (2) a 1-hydroxynaphthalene-benzothiophene polymer. Our experimental work during this quarter concentrated on. As several possible synthetic routes to the target molecule, 4(4'-hydroxy-5',6',7',8'-tetrahydro- l'-naphthylmethyl)-6-methyldibenzothiophene. We tried synthesizing the intermediates for our first method, in which we couple a metalated 4-methyldibenzothiophene with 4-formyl-5,6,7,8-tetrahydro-1-naphthol. We found that we could easily metalate dibenzothiophene, and then add a methyl group to the 4-position to give 4-methyldibenzothiophene in greater than 80% yield by using t-butyllithium in tetrahydropyran followed by dimethylsulfate. However, adding the second metal to the desired 4' position using the same method was more difficult, and instead the reaction occurred on the methyl group. Therefore, we will investigate an alternative method, in which a hydroxy group is added in order to help direct the second metalation step to the 4' position on 4-methyldibenzothiophene.

30454 (DOE/PC/90047–T4) **Synthesis of octane enhancers during slurry-phase Fischer-Tropsch: Quarterly technical progress report No. 5, October 1, 1991–December 31, 1991.** Marcelin, G. Altamira Instruments, Inc., Pittsburgh, PA (United States). 10 Jun 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC90047. Order Number DE92018872. Source: OSTI; NTIS; GPO Dep.

The objective of this project is to investigate three possible routes to the formation of ethers, in particular methyl tert-butyl ether (MTBE), during slurry phase Fischer-Tropsch reaction. The three reaction schemes to be investigated are: Addition of isobutylene during the formation of methanol and/or higher alcohols directly from CO and H_2 during slurry-phase Fischer-Tropsch. Addition of isobutylene to FT liquid products including alcohols in a slurry-phase reactor containing an MTBE or other acid catalyst. Addition of methanol to slurry phase FT synthesis making iso-olefins.

30455 (DOE/PC/90289–T5) **Enhancing low severity coal liquefaction reactivity using mild chemical pretreatment: Quarterly technical progress report, December 1991–February 1992.** Shams, K.G.; Miller, R.L.; Baldwin, R.M. Colorado School of Mines, Golden, CO (United States). Dept. of Chemical Engineering and Petroleum Refining. 13 Jul 1992. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90289 ;AC22-88PC88812. Order Number DE92019864. Source: OSTI; NTIS; GPO Dep.

In this paper, we describe results from a study in which mild chemical pretreatment of coal has been used to enhance low severity liquefaction reactivity. We have found that ambient pretreatment of eight Argonne coals using methanol and a trace amount of hydrochloric acid improves THF-soluble conversions 24.5 wt% (maf basis) for Wyodak subbituminous coal and 28.4 wt% for Beulah-Zap lignite with an average increase of 14.9 wt% for liquefaction of the eight coals at 623 K (350°C) reaction temperature and 30 min. reaction time. Similar enhancement results occurred using, hexane or acetone in place of methanol. Pretreatment with methanol and HCl separately indicated that both reagents were necessary to achieve maximum liquefaction improvement. Acid concentration was the most important pretreatment variable studied; liquefaction reactivity increased with increasing acid concentration up to 2 vol%. No appreciable effect on reactivity was observed at higher acid concentrations. Although vapor phase alcohol/HCl mixtures have been shown to partially alkylate bituminous coals, analysis of Wyodak and Illinois #6 coal samples indicated that no organic phase alteration occurred during pretreatment; however, over 90 wt% of the calcium was removed from each coal. Calcium is thought to catalyze retrogressive reactions during coal pyrolysis, and thus calcium removal prior to low severity liquefaction minimizes the rate of THF-insoluble product formation.

30456 (DOE/PC/90304–T2) **The effect of selective absorption on coal conversion, October–December 1991.** Larsen, J.W.; Lazarov, L.; Amui, J. Lehigh Univ., Bethlehem, PA (United States). Dept. of Chemistry. May 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90304. Order Number DE92018879. Source: OSTI; NTIS; GPO Dep.

The objectives of this report are to (1) determine the importance of the presence of added hydrogen donor compounds within the coal in the first stage of direct liquefaction processes; (2) determine the composition of the solvent absorbed by and present within the coal in the first stage of direct coal liquefaction.

30457 (DOE/PC/91044–T1) **Mitigating crosslinking reactions through preconversion strategies: Quarterly progress report.** SRI International, Menlo Park, CA (United States). Molecular Physics Lab. Mar 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91044. Order Number DE92018707. Source: OSTI; NTIS; GPO Dep.

The ultimate goal of this research is to develop preconversion techniques that will mitigate crosslinking reactions and thereby substantially increase liquid yields during subsequent liquefaction. The immediate objective is to explore the effect of several pretreatments on the evolution of oxygen functions, crosslinking, and conversion in laboratory studies. The pretreatments to be explored include several that hold promise for effecting deoxygenation or other reduction, for example, treatment with CO/water/base and hydroquinones, either alone or in conjunction. The effects of these pretreatments on functional group distribution, macromolecular structure, and liquefaction will be compared with those that have shown promise in the past for improved conversions, such as simple hydrothermal pretreatment, mild hydrogenation with dispersed catalysts, and demineralization. A second objective is to develop suitable test procedures for assessing the effect of the pretreatment on subsequent liquefaction and achieve also an understanding the chemical origin of the effect. These test procedures will include the use of proton magnetic resonance thermal analysis (PMRTA) for determining the effect of pretreatment on fluidity as liquefaction conditions (temperature, pressure) are approached. They will also involve the use of simpler and more pertinent laboratory measures of volatile product yields following the batch liquefactions that will be run to test the susceptibility of pretreated coals to subsequent liquefaction.

30458 (DOE/PC/91334–T57) **Sulfur removal from high-sulfur Illinois coal by low-temperature perchloroethylene (PCE) extraction: Technical report, December 1, 1991–February 29, 1992.** Chou, M.I.M (Illinois State Geological Survey, Champaign, IL (United States)); Lytle, J.M.; Ruch, R.R.; Kruse, C.W.; Chaven, C.; Hackley, K.C.; Hughes, R.E.; Harvey, R.D.; Frost, J.K.; Buchanan, D.H.; Stucki, J.W.; Huffman, G.; Huggins, F.E. Illinois State Geological Survey, Champaign, IL (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States); Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States). DOE Contract FG22-91PC91334. Order Number DE92018296. Source: OSTI; NTIS; GPO Dep.

A pre-combustion coal desulfurization process at 120°C using perchloroethylene (PCE) to remove up to 70% of the organic sulfur has been developed by the Midwest Ore Processing Co. (MWOPC). However, this process has not yet proven to be as successful with Illinois coals as it has for Ohio and Indiana coals. In addition, the high levels of organic sulfur removals observed by the MWOPC may be due to certain errors involved in the ASTM data interpretation; this needs verification. For example, elemental sulfur extracted by the PCE may be derived from pyrite oxidation during coal preoxidation, but it may be interpreted as organic sulfur removed by the PCE using ASTM analysis. The purposes of this research are to independently confirm and possibly to improve the organic sulfur removal from Illinois coals with the PCE desulfurization process reported by the MWOPC and to verify the forms-of-sulfur determination using the ASTM method for the PCE process evaluation.

30459 (DOE/PC/91334–T58) **Desulfurization of hot fuel gas produced from high-chlorine Illinois coals: Technical report, December 1, 1991–February 29, 1992.** O'Brien, W.S. (Southern Illinois Univ., Carbondale, IL (United States)); Gupta, R.P. Illinois State Geological Survey, Champaign, IL (United States). [1992]. 24p. Sponsored by USDOE, Washington, DC (United States); Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States). DOE Contract FG22-91PC91334. Order Number DE92018297. Source: OSTI; NTIS; GPO Dep.

There is a primary need to increase the utilization of Illinois coal resources by developing new methods of converting the coal into electricity by highly efficient and environmentally acceptable systems. New coal gasification processes are now being developed that can generate electricity with high thermal efficiency in either an integrated gasification combined cycle (IGCC) system or a molten carbonate fuel cell (MCFC). Both of-these new coal-to-electricity pathways require that the coal-derived fuel gas be at a high temperature and be free of potential pollutants, such as-sulfur compounds. Unfortunately, some high-sulfur Illinois coals also contain significant chlorine which converts into hydrogen chloride (HCl) in the coal gas. This project investigates the effect of HCl, in concentrations typical of a gasifier fed by high-chlorine Illinois coals, on zinc-titanate sorbents that are currently being developed for H_2S and COS removal from hot coal gas. This study is designed to identify any deleterious changes in the sorbent caused by HCl, both in adsorptive operation and in the regeneration cycle, and will pave the way to modify the sorbent formulation or the process operating procedure to remove HCl along with the H_2S and COS from hot coal gas. This will negate any harmful consequences Of utilizing high-chlorine Illinois coal in these processes.

30460 (UCRL-CR–111324) **Mild coal gasification: Product separation.** Wallman, P.H.; Singleton, M.F. Lawrence Livermore National Lab., CA (United States). 4 Aug 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019572. Source: OSTI; NTIS; GPO Dep.

Our general objective is to further the development of efficient continuous mild coal gasification processes. The research this year has been focused on product separation problems and particularly the problem of separating entrained ultra-fine particles from the chemically reactive environment of the product gas stream. Specifically, the objective of the present work has been to study candidate barrier filters for application to mild coal gasification processes. Our approach has been to select the most promising existing designs, to develop a design of our own and to test the designs in our bench-scale gasification apparatus. As a first step towards selection of the most promising barrier filter we have determined coking rates on several candidate filter media.

0106 Properties and Composition

Refer also to citation(s) 30422, 30424, 30425, 30439, 30440, 30487, 30488, 30489, 30490, 30491, 30492, 30493, 30494, 30495, 30496, 30497, 30498, 30499, 30500, 30501, 30502, 30503, 30504, 30505, 30506, 30507, 30508, 30509, 30510, 30511, 30512, 30513, 30514, 30515, 30516, 30517, 31724

30461 (CONF-920815–4) **An EPR spin probe method for characterizing changes in the accessible regions of coal upon oxidation.** Sady, W.; Kispert, L.D.; Spears, D.R. Alabama Univ., University, AL (United States). Dept. of Chemistry. [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90284. From 204. American Chemical Society national meeting; Washington, DC (United States); 23-28 Aug 1992. Order Number DE92018529. Source: OSTI; NTIS; GPO Dep.

Eight Argonne Premium Coal Samples (APCS) were weathered in air and the structural and chemical changes that upon swelling with toluene and pyridine were, examined by an EPR spin probe method developed in this laboratory. Under mild oxidation conditions and swelling with toluene large structural changes were observed for lignite (Beulah-Zap) which suggested the collapse of the coal structure. This did not occur for higher rank coal. Upon oxidation and swelling with toluene and pyridine an increase occurred in the amino substituted spin probe concentration for coals with the carbon percent above 80%. A maximum was found for the creation of 5 Å diameter pores upon swelling with pyridine at 85% C.

30462 (DOE/PC/79903–T7, pp. 8-25) **Characterization of fly ash.** Stanford Univ., CA (United States). High Temperature Gasdynamics Lab. Feb 1991. In *Optical properties of flyash. Quarterly* *report. October 1–December 31, 1990.* 56p. Order Number DE91010547. Source: OSTI; NTIS.

The chemical composition of fly ash, although uniform in a single particle, varies significantly from particle to particle. An important object of Task 1 has been to quantify this heterogeneity of the ash by performing microanalysis in order to obtain the chemical compositions of individual particles. The state-of-art microanalytical technique for particulates is EDS (Energy Dispersive X-ray Spectroscopy). The SEM (Scanning Electron Microscope) is used in locating individual particles on the sample, and a computer is used to automate the process so that hundreds of particles can be analyzed without human intervention in a relatively short time. The entire system is referred to as CCSEM (Computer Controlled Scanning Electron Microanalysis). In order that the CCSEM data be interpreted correctly, it is necessary to understand the physics of the EDS process itself as well as the statistical limitations involved in analyzing a sample of finite size. An analysis of the physical and statistical factors that limit the accuracy of the data is useful in creating broad composition classes for the ashes.

30463 (DOE/PC/79903–T7, pp. 26-38) **The optical properties of high temperature slag.** Stanford Univ., CA (United States). High Temperature Gasdynamics Lab. Feb 1991. In *Optical properties of flyash. Quarterly report, October 1–December 31, 1990.* 56p. Order Number DE91010547. Source: OSTI; NTIS.

The immediate goal of this task is to measure the high temperature optical properties of coal slag. The complex refractive index, m = n + ik, is being measured for synthetic slags at high temperatures, near 1,900 K. The effect of composition on the optical properties is also being investigated. During the past quarter, the optical system was further scrutinized and previously reported optical alignment difficulties were eliminated. Measurements were made using the two liquids CCl_4 and water, to quantify the measurement accuracy. Several alignment problems were discovered that produced reflectance errors as large as 10-20%. In light of this discovery the reflectances of all five SAxx slags were re-measured and the reflectances of two new slags, SA2S and SA4S, were also measured.

30464 (DOE/PC/79903–T7, pp. 39-52) **Measurement of radiant properties of fly ash dispersions.** Stanford Univ., CA (United States). High Temperature Gasdynamics Lab. Feb 1991. In *Optical properties of flyash. Quarterly report, October 1–December 31, 1990.* 56p. Order Number DE91010547. Source: OSTI; NTIS.

During the past year, considerable effort has been devoted to the question of how to design a suitable bench-scale experiment to satisfy the objective of Task 4. A major design consideration was the conclusion that there is no known method for dispersing and adequately deagglomerating a sample of ash powder into a gas stream to reproduce the conditions of the ash aerosol before it was collected from the exhaust stream to reproduce the conditions of the ash aerosol before it was collected from the exhaust stream of the coal combustor. On the other hand, the authors found that it is possible to produce stable, well-deagglomerated dispersions of flyash in liquids by using ultrasonic agitation. This fact allows one to perform optical extinction and scattering experiments from much smaller volume of dispersed ash (contained in an optical test cell) than is possible with a gaseous dispersion. During the past quarter more detailed consideration has been given to the design of a transmissometer to measure the spectral extinction of a liquid ash suspension in a cell of the type shown. Two important aspects of the design were addressed, as detailed below. The first concerns the necessary modifications to Mie scattering theory to allow for the fact that the background medium in which the ash is dispersed is a liquid, having a (complex) refractive index markedly different from that of a gas (which may generally be taken as real and of unit magnitude). The second concerned the practical design of the optical configuration to maximize the optical signal while rejecting light scattered at small angles to the forward direction.

30465 (DOE/PC/88923–T4) **^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, June 1, 1991–August 31, 1991.** Verkade, J.G. Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry. [1991]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-88PC88923. Order Number DE92018972. Source: OSTI; NTIS; GPO Dep.

The purpose of this research is to develop a convenient, reliable and rapid NMR method for the determination of labile-hydrogen functional groups and organic sulfur compounds which are components of coal and coal-derived materials. For this purpose, the former functional groups, including water molecules, are derivatized with reagents containing NMR-active nuclei such as ^{31}P or ^{119}Sn, while sulfur groups are derivatized with ^{195}Pt NMR tagging reagents. Knowledge of the heteroatom composition of coals is necessary for the development of increasingly sophisticated coal processing technologies.

30466 (DOE/PC/88923–T5) **^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, January 1, 1991–March 31, 1991.** Verkade, J.G. Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry. [1991]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-88PC88923. Order Number DE92018971. Source: OSTI; NTIS; GPO Dep.

Research on coal structural analysis continues. This paper discusses the use of ^{31}P, ^{119}Sn, and ^{195}Pt as NMR tagging reagents in the probing of coal structure. (VC)

30467 (DOE/PC/88923–T6) **^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, October 1, 1990–December 31, 1990.** Verkade, J.G. Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry. [1990]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-88PC88923. Order Number DE92018970. Source: OSTI; NTIS; GPO Dep.

Research on coal structural analysis continues. Significant progress has been made in developing a new NMR approach to the reaction in which the phosphorus-containing product incorporates two ^{31}P nuclei for every water molecule reacted. The latter circumstance allows more precise values of low water contents to be realized owing to better integration of the ^{31}P NMR peak. We have measured a series of model pyridine/H_2O mixtures by our technique and the results are summarized here. Also collected are similar analyses with pyridine extracts of Argonne Premium coal samples. Results seem to indicate that tightly bound water is being released by pyridine. Further experiments are planned to elucidate this possibility.

30468 (DOE/PC/88923–T7) **^{31}P NMR analysis of coal moieties bearing -OH, -NH and -SH functions: Quarterly report, January 1, 1990–March 31, 1990.** Verkade, J.G. Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry. [1990]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-88PC88923. Order Number DE92018969. Source: OSTI; NTIS; GPO Dep.

Research continues on the structural analysis of coal. In attempting to derivatize solid coal for solid state NMR analysis, we observed ^{31}P NMR shifts in an unexpected region; these interesting leads will be pursued on the chance that the reaction we have evoked holds potential for yielding new coal characterizational information. Two very gratifying results have emerged from our ^{119}Sn chemical shift measurements of a limited set of model compounds in pyridine. Firstly, the chemical shift dispersion is very large for phenols, alcohols and amides. Secondly, unlike ^{119}Sn chemical shifts in hexane or chloroform, the shifts in pyridine are concentration independent.

30469 (DOE/PC/88923–T8) **^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Final technical report.** Verkade, J.G. Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry. 31 Aug 1991. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-88PC88923. Order Number DE92018968. Source: OSTI; NTIS; GPO Dep.

NMR reagents for the speciation and quantitation of labile-hydrogen functional groups and sulfur groups in coal ligands have been synthesized and evaluated. These reagents, which contain the NMR-active nuclei ^{31}p, ^{119}Sn or ^{195}pt, were designed to possess improved chemical shift resolution over reagents reported in the literature. Our efforts were successful in the case of the new

^{31}p and ^{119}Sn reagents we developed, but the ^{195}pt work on sulfur groups was only partially successful in as much as the grant came to a close and was not renewed. Our success with ^{31}P and ^{119}Sn NMR reagents came to the attention of Amoco and they have recently expressed interest in further supporting that work. A further measure of the success of our efforts can be seen in the nine publications supported by this grant which are cited in the reference list.

30470 (DOE/PC/88939-T3) **Formation and retention of methane in coal: Final report.** Hucka, V.J.; Bodily, D.M.; Huang, H. Utah Univ., Salt Lake City, UT (United States). Dept. of Mining Engineering. 15 May 1992. 374p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-88PC88939. Order Number DE92018094. Source: OSTI; NTIS; GPO Dep.

The formation and retention of methane in coalbeds was studied for ten Utah coal samples, one Colorado coal sample and eight coal samples from the Argonne Premium Coal Sample Bank.Methane gas content of the Utah and Colorado coals varied from zero to 9 cm^3/g. The Utah coals were all high volatile bituminous coals. The Colorado coal was a gassy medium volatile bituminous coal. The Argonne coals cover a range or rank from lignite to low volatile bituminous coal and were used to determine the effect of rank in laboratory studies. The methane content of six selected Utah coal seams and the Colorado coal seam was measured in situ using a special sample collection device and a bubble desorbometer. Coal samples were collected at each measurement site for laboratory analysis. The cleat and joint system was evaluated for the coal and surrounding rocks and geological conditions were noted. Permeability measurements were performed on selected samples and all samples were analyzed for proximate and ultimate analysis, petrographic analysis, ^{13}C NMR dipolar-dephasing spectroscopy, and density analysis. The observed methane adsorption behavior was correlated with the chemical structure and physical properties of the coals.

30471 (DOE/PC/89758-T2, pp. 7, Paper 4) **ESCA studies of particulate pyrite.** Utah Univ., Salt Lake City, UT (United States). [1990]. In *Surface electrochemical control for fine coal and pyrite separation. Technical progress report, October 1–December 31, 1990.* 56p. Order Number DE91008951. Source: OSTI; NTIS.

Preliminary ESCA analysis has been carried out on particulate pyrite to characterize the surface films formed by conditioning at various potentials. The use of an independent method of surface analysis such as ESCA can aid the interpretation of the results of the cyclic voltammetric studies of the electrochemistry of pyrite. Preliminary results indicated that the sulphur 2p doublets on hydrophobic and hydrophilic pyrite were indistinguishable but there was a larger percentage of a low oxidation state sulphur compound on the surface of the hydrophobic material. It would appear the ESCA is not the best tool for studying the surface chemistry of pyrite. Other techniques such as Raman spectroscopy or EXAFS would have greater potential for determining the nature of the sulphur species on the pyrite. Raman spectroscopy has the further advantage of being able to do the analysis in-situ. The use of Laser Raman spectroscopy is being actively pursued.

30472 (DOE/PC/91292-T3) **Rheological properties essential for the atomization of coal water slurries (CWS): Quarterly progress report, March 15, 1992–June 15, 1992.** Ohene, F. Grambling State Univ., LA (United States). Dept. of Chemistry. [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91292. Order Number DE92019867. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project is to perform experiments to understand the effect of high shear and extensional properties on the atomization of coal-water slurries (CWS). Several CWS were prepared and their low shear rheological properties (i.e. rheology as a function of concentration, constant shear and, additive type, stability and slip effect) performed. The stability was determined using a settling column to study the shift in mass of the CWS as a function of time. Low shear testing of the slurries were used to determine the effect of yield stress on the concentration of the slurries.

30473 (DOE/PC/91305-2) **Characterization of porosity via secondary reactions: Quarterly technical progress report, 15 December 1991–15 March 1992.** Calo, J.M. Brown Univ., Providence, RI (United States). Div. of Engineering. [1992]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91305. Order Number DE92019865. Source: OSTI; NTIS; GPO Dep.

The new TPD-MS/TGA system has been constructed and successfully tested. This system is constructed around a new Cahn D-200 digital recording microbalance, which was purchased for this purpose. The TPD reactor is the "hangdown" tube for the microbalance. The system can operate at pressures from vacuum to atmospheric. Control and data logging of this new experimental system are performed using a Macintosh II microcomputer with a GW Instruments 625 Jr. interface. All the control software has been written and tested. A new furnace with low "thermal capacitance" was constructed for this system which allows linear heating rates to 1100°C at rates as high as 20OK/min. This system will become a principal apparatus for obtaining some of the data required for the development of porosity characterization techniques via TPD. Software has been written for the analysis of small angle scattering (SAS) data, obtained with either X-rays (SAXS) or neutrons (SANS), which will be used in addition to gas adsorption techniques to characterize porosity for comparison with secondary reaction data.

30474 (NUTEK-KOL-92-2) **Final report of ICCP-activity, stage 5.** Bengtsson, M. (Margaretha Bengtsson Konsult AB, Nykoeping (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1991. 54p. (In Swedish, English). Project NUTEK-226-007. Order Number DE92563029. Source: OSTI; NTIS.

The report comprises an account from the ICCP meting within Commission 3, Application of Coal Petrology to Utilisation, as well as new statutes for the ICCP.

0108 Waste Management

Refer also to citation(s) 30419, 30462, 30463, 30464, 30554, 30867, 31070, 31071, 32538, 32539

30475 (ANL/CP-76723) **Control of mercury emissions from coal-fired boilers.** Huang, H.S.; Livengood, C.D. Argonne National Lab., IL (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920736-4: Coal preparation, utilization, and environmental control conference, Pittsburgh, PA (United States), 26-31 Jul 1992). Order Number DE92019036. Source: OSTI; NTIS; GPO Dep.

This project at Argonne is designed to investigate new concepts leading to advanced control technologies for fossil-energy systems. The objective of this new task on air toxics control is to develop new or improved, cost-effective control technology for the abatement of emissions of hazardous air pollutants (HAPs) from fossil-fuel combustion plants and to evaluate the possible effects of any captured species on waste disposal. The HAPs to be investigated initially in this task include mercury and arsenic compounds.

30476 (DOE/PC/89778-T1) **Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990.** Hepworth, M.T. Minnesota Univ., Minneapolis, MN (United States). Mineral Resources Research Center. [1990]. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018324. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be staged to reduce NO_x and SO_x emissions. Iron oxide, as an alternative to lime or limestone may be effective not only as a desulfurizing agent, but under the right conditions of oxygen potential and after combination with sulfur, the reaction products of coal gases with iron oxide can act as a flux to produce a fluid phase. The thermodynamic conditions for determining the most effective operating conditions of the first stage of a combustor are calculated for several Illinois coals. These conditions include contact of the gas with the phase combinations: CaO/$CaSO_4$, CaO/CaS, and Fe/FeO/liquid for the temperature range 950° to 1300°C. In the latter system, the minimum dosage of iron required at equilibrium and the calculated maximum percent sulfur removal are reported. Also given are the expected pounds of SO_2 per million Btu of heat evolution calculated for complete combustion. The calculations indicate that for the Fe-O-S system, higher temperatures give better results approaching 96 percent sulfur removal from a coal containing 4.2% sulfur. For this example, the stack gas emerging from the second stage of combustion under stoichiometric conditions would contain 0.36 pounds of SO_2 per million BTU's of heat generated. The temperature limits of the sulfate and sulfide forming reactions are defined.

30477 (DOE/PC/89778–T3) **Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991.** Hepworth, M.T. Minnesota Univ., Minneapolis, MN (United States). Mineral Resources Research Center. [1991]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018322. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be staged to reduce NO_x and SO_x emissions. Iron oxide, as an alternative to lime or limestone may be effective not only as a desulfurizing agent, but under the right conditions of oxygen potential and after combination with sulfur, the reaction products of coal gases with iron oxide can act as a flux to produce a fluid phase. The thermodynamic conditions for determining the most effective operating conditions of the first stage of a combustor are calculated for several Illinois coal. The conditions studied during this quarter were for contact of a coal gas with a liquid iron oxysulfide phase for one temperature: 1200°C, for which data in the literature were available. The calculations are in terms of the expected pounds of SO_2 per million Btu of heat evolution calculated for complete combustion of the coal. The calculations indicate that the lowest sulfur levels in the off-gas occur in contact with iron in contact with a liquid phase containing 49.0 atom% iron, 29.5 atom% oxygen and 21.5 atom% sulfur. Under these conditions, the stack gas contain 0.59 pounds of SO_2 per million BTU's of heat generated. The results of the calculations are reported both in tabular form and in three-dimensional representation. Lowest values occur as a "trough" on the iron-oxygen-sulfur isotherm at compositions at the phase boundary of the oxysulfide liquid region in equilibrium with iron.

30478 (DOE/PC/89778–T4) **Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991.** Hepworth, M.T. Minnesota Univ., St. Paul, MN (United States). Mineral Resources Research Center. [1991]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018321. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be staged to reduce NO_x and SO_x emissions. Iron oxide, as an alternative to lime or limestone may be effective not only as a desulfurizing agent, but under the right conditions of oxygen potential and after combination with sulfur, the reaction products of coal gases with iron oxide can act as a flux to produce a fluid phase. The thermodynamic conditions for optimum removal of sulfur from the first stage of a coal combustor are being determined by experiment and by use of existing data. Contour plots in which the pounds of $S0_2$ per million Btu of calorific power are plotted on isothermal ternary phase diagrams of the oxygen-sulfur system. These contour plots determine the most favorable conditions for coal combustion in the presence of added iron oxide. Lowest $S0_2$ pressures are close to the phase boundary limit between iron saturation and the oxysulfide liquid phase. Experimental studies confirm the observations of previous investigators that the oxysulfide liquid exhibits a tendency to creep up and over the walls of containing vessels presumably as a result of surface tension effects. These effects, which make equilibration measurements difficult, may be favorable with respect to producing a high degree of reactivity of the oxysulfide with coal gases and resultant rapid reaction kinetics. Kinetic measurements, which are now being undertaken, will help to provide information on any such favorable effects.

30479 (DOE/PC/89778–T5) **Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, June 1, 1991–August 31, 1991.** Hepworth, M.T. Minnesota Univ., Minneapolis, MN (United States). Dept. of Civil and Mineral Engineering. [1991]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018320. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be staged to reduce NO_x and So_x emissions. Iron oxide, as an alternative to lime or limestone may be effective not only as a desulfurizing agent, but under the right conditions of oxygen potential and after combination with sulfur, the reaction products of coal gases with iron oxide can act as a flux to produce a fluid phase. The thermodynamic conditions for optimum removal of sulfur from the first stage of a coal combustor are being determined by experiment and by use of existing data. Contour plots in which the pounds Of $S0_2$ per million Btu of calorific power are plotted on isothermal ternary phase diagrams of the iron-oxygen-sulfur system. These contour plots determine the most favorable conditions for coal combustion in the presence of added iron oxide. Lowest $S0_2$ pressures are close to the phase boundary limit between iron saturation and the oxysulfide liquid phase. Experimental studies in which ceramic containers (99% alumina) were used to contain the liquid were hampered by the tendency for the liquid to flow up and over the walls of containing vessels presumably as a result of surface tension effects. These effects, which make equilibration measurements difficult, may be favorable with respect to producing a high degree of reactivity of the oxysulfide with coal gases and resultant rapid reaction kinetics. As result of this problem, platinum containment vessels containers appear to avoid these surface tension effects. Thermodynamic and kinetic measurements are now being explored by thermogravimetric analysis.

30480 (DOE/PC/89778–T6) **Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991.** Hepworth, M.T. Minnesota Univ., Minneapolis, MN (United States). Dept. of Civil and Mineral Engineering. [1991]. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018319. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be staged to reduce NO_x and So_x emissions. Iron oxide, as an alternative to lime or limestone may be effective not only as a desulfurizing agent, but under the right conditions of oxygen potential and after combination with sulfur, the reaction products of coal gases with iron oxide can act as a flux to produce a fluid phase. The thermodynamic conditions for optimum removal of sulfur from the first stage of a coal combustor are being determined by experiment and by use of existing data. Analysis of the phase equilibria indicates that optimum conditions for deployment of the reducing stage of a multi-stage burner operating with iron injection are close to the boundary of the liquid iron oxysulfide phase with iron-saturation. Two prior investigations differ with respect to the location of this phase boundary at temperatures over 1400°C, with reference 1, showing the phase boundary nearer the iron-rich corner than reference 2 which gives the boundary further into the liquid region. Effort has been directed during this quarter to showing that this phase boundary is sufficiently close to the iron-rich liquid region, at higher temperatures, in order to allow for smooth operation of a multistage burner without the problem of iron deposition.

30481 (DOE/PC/89778–T7) **Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990.** Hepworth, M.T. Minnesota Univ., Minneapolis, MN (United States). Mineral Resources Research Center. 6 Mar 1990. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018318. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be stages to reduce NO_x and

SO_x emissions. Iron oxide, as an alternative to lime or-limestone may be effective not only as a desulfurizing agent, but, under the right conditions of oxygen potential, it can act as a flux to produce a glassy slag This glassy slag should be dense and environmentally inert. In this reporting period, the thermodynamic conditions for the operation of the first stage of a combustor operating on a Illinois No. 2 Coal have been examined with respect to the formation of the four phase equilibrium:FeO(wustite)/Fe/liquid/gas over the temperature 950° to 1300°C. The minimum dosages of iron oxide which are required at equilibrium and the calculated maximum percent sulfur removal are reported. Also given are the expected pounds of S per million Btu of heat SO_2 evolution calculated for complete combustion. These preliminary results indicate that higher temperatures, in the range studied, give better results approaching 96 percent sulfur removal from a coal containing (on a dry basis) 3.29% by weight sulfur. A comparison is made between iron oxide and lime as a desulfurizing agent. With lime, the thermodynamic conditions were chosen: a set of conditions where the compound calcium sulfide is the product and a set of conditions where calcium sulfate is the product. The temperature limits of the sulfate forming and sulfide forming reactions are defined.

30482 (DOE/PC/89778-T8) **Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990.** Hepworth, M.T. Minnesota Univ., Minneapolis, MN (United States). Mineral Resources Research Center. [1990]. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89778. Order Number DE92018317. Source: OSTI; NTIS; GPO Dep.

Slagging combustors with injected lime or limestone are being considered as replacements for conventional coal burners. They have advantages in that they can be staged to reduce NO_x and SO_x emissions. Iron oxide, as an alternative to lime or limestone may be effective not only as a desulfurizing agent, but, under the right conditions of oxygen potential, it can act as a flux to produce a glassy slag. This glassy slag should be dense and environmentally inert. In this reporting period, the thermodynamic conditions are determined for the operation of the first stage of a combustor which would have as its feed six types of coals. The calculations are made for the four phase equilibrium: FeO(wustite)/Fe/Liquid/Gas over the temperature range 950° to 1300°C. The minimum dosage of iron oxide required at equilibrium an the calculated maximum percent sulfur removal are reported. Also given are the expected pounds of SO_2 per million Btu of heat evolution calculated for complete combustion. These preliminary results indicate in the Fe-O-S system that higher temperatures give better results approaching 96 percent sulfur removal from a coal containing (on a dry basis) 3.29% by weight sulfur. In the prior reporting period, a comparison is made between iron oxide and lime as a desulfurizing agent. With lime, the thermodynamic conditions were chosen: a set of conditions where the compound calcium sulfide is the product and a set of conditions where calcium sulfate is the product. The temperature limits of the sulfate forming and sulfide forming reactions were defined.

30483 (DOE/PC/89784-11) **Binding and catalytic reduction of NO by transition metal aluminosilicates: Technical progress report, March 1992–May 1992.** Klier, K.; Herman, R.G.; Hou, S. Lehigh Univ., Bethlehem, PA (United States). Jun 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89784. Order Number DE92019855. Source: OSTI; NTIS; GPO Dep.

Na, Co^{2+}, Ce^{3+}, and $Co^{2+}Ce^{3+}$ exchanged A type zeolite have been tested for NO and N_2O adsorption and decomposition at room temperature. Dynamic temperature programmed desorption (TPD) studies were also carried out with these four zeolites, as well as with CeO_2 and CoA zeolite mixed with CeO_2. It was demonstrated that NO was especially decomposed into N_2, with some N_2, with some N_2O, over the doubly ion exchanged CoCeA zeolite that contained 1.77 Co and 2 Ce per unit cell. Some segregation of CeO_2 occurred during these experiments, and a lower content of Ce in the CoCeA zeolite might be utilizable.

30484 (DOE/PC/90546-T4) **Confined zone dispersion flue gas desulfurization demonstration: Volume 1, Quarterly report No. 4, August 1, 1991–October 31, 1991.** Bechtel Corp., San Francisco, CA (United States). 27 Feb 1992. 53p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-91PC90546. Order Number DE92018881. Source: OSTI; NTIS; GPO Dep.

The confined zone dispersion (CZD) process involves flue gas post-treatment, physically located between a boiler's outlet and its particulate collector, which in the majority of cases is an electrostatic precipitator. The features that distinguish this process from other similar injection processes are: Injection of an alkaline slurry directly into the duct, instead of injection of dry solids into the duct ahead of a fabric filter. Use of an ultrafine calcium/magnesium hydroxide, type S pressure-hydrated dolomitic lime. This commercial product is made from plentiful, naturally occurring dolomite. Low residence time, made possible by the high effective surface area of the Type S lime. Localized dispersion of the reagent. Slurry droplets contact only part of the gas while the droplets are drying, to remove up to 50 percent of the SO_2 and significant amounts of NO_x. The process uses dual fluid rather than rotary atomizers. Improved electrostatic precipitator performance via gas conditioning from the increased water vapor content, and lower temperatures. Supplemental conditioning with SO_3 is not believed necessary for satisfactory removal of particulate matter.

0109 Environmental Aspects

30485 (INIS-mf-13353) **Energy and environment: transitions in Eastern Europe: Book of abstracts.** Vyzkumny Ustav Energeticky, Prague (Czechoslovakia); North Dakota Univ., Grand Forks, ND (United States). 1992 294p. (CONF-920427-: Energy and environment: transitions in Eastern Europe, Prague (Czechoslovakia), 20-23 Apr 1992). Order Number DE93601858. Source: OSTI; NTIS (US Sales Only); INIS.

The proceedings contain 91 abstracts of contributions delivered as lectures and 47 abstracts of contributions presented as posters. Out of them, 4 have been inputted in INIS. They deal with air pollution in Turkey, with impacts of open pit mines in North Bohemia on the quality of air, environmental impacts of the thermal power plant at Drobeta Turnu Severin in Romania, and with Latvia's environmental problems associated with energy supplies. (M.D.).

30486 (UCRL-JC-110922-Rev.1) **The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1.** Penner, J.E. Lawrence Livermore National Lab., CA (United States). Jul 1992. 45p. Sponsored by USDOE, Washington, DC (United States); Environmental Protection Agency, Washington, DC (United States); National Aeronautics and Space Administration, Washington, DC (United States). DOE Contract W-7405-ENG-48. Grant NAGW-1827. (CONF-9107235-1-Rev.1: SNOWMASS meeting, Denver, CO (United States), 21 Jul - 10 aug 1991). Order Number DE92019622. Source: OSTI; NTIS; INIS; GPO Dep.

In this report, the importance of CO_2, CH_4, N_2O, and COS for atmospheric chemistry, air quality, and climate is discussed. Current estimates of the sources for each specie, deriving the fraction of each source that is due to specific land use practices or land cover categories are reviewed. Understanding the current trends of those species with known increasing abundances and projecting increases into the future is possible if the estimated sources from human activity and land use change can be projected and if the known atmospheric sinks and the interactions in atmospheric chemistry and climate change are appropriately taken into account Regional trends in the short-lived species can be projected as well, assuming the estimated sources and sinks are correct However, significant uncertainties continue to surround the estimated budgets for most of these species. Uncertainties and the estimated ranges in different source strength estimates for each specie are also discussed.

0110 Reserves, Geology, and Exploration

30487 (GTK-TURVE-125) **The peat resources of Miehikkaelae and their usefulness.** Maekilae, M.; Grundstroem, A. Geological Survey of Finland, Espoo (Finland). 1990. 111p. (In Finnish). Order Number DE92562960. Source: OSTI; NTIS.

The Geological Survey of Finland investigated the quantity and quality of the industrially exploitable peatlands in the municipality of Miehikkaelae, southeastern Finland, during 1973, 1982 and 1985. Altogether 1616 hectares of peatland were studied. This area covers 3,8 % of the land area. The total peatland area suitable for fuel peat production is 355 hectares. Useful peat resources are 8.25 million m^3 situ. The energy content equals to 3.17 million MWh as calculated for 50 % moisture content. The area suitable for horticultural peat production is 330 hectares, containing about 4.80 million m^3 of peat in situ. The average thickness of peat deposits is 2.33 m, including 0,89 m of slightly humified surfical layer. The total amount of peat is 37.68 million m^3. Area deeper than 2 m contains 30.26 million m^3 or 80 % of the total reserves including 18.33 million m^3 of well humified peat. 63 % of the peat layers are composed of Sphagnum, 36 % Carex and the rest Bryales peat. The average net calorific value of dry peat is 20 1 MJ/kg and 8.8 MJ/kg when calculated for 50 % moisture content. The average dry bulk density of the samples is 71 kg/m^3 in situ, moisture content 92.3 % of wet weight, pH-value 3.7, ash content 1.5 % and sulphur content 0.14 % on dry bases.

30488 (GTK-TURVE–216) **The peat resources of the municipality of Juuka and their potentialities in fuel peat production. Part 1.** Saarelainen, J. Geological Survey of Finland, Kuopio (Finland). 1988. 244p. (In Finnish). Order Number DE92562948. Source: OSTI; NTIS.

The Geological Survey of Finland studied the mires and peat deposits in the municipality of Juuka in 1986. The study is a part of the total inventory of the peat resources of Finland that Geological Survey is undertaking. The main goal of the studies is to locate the peat resources with industrial interest main emphasis beeing on fuel peat production. Anyway, also other important ways to use mires are taken into account, including conservation and recreation. The detailed survey on a peatland was made using a survey line grid where the main line was run through the long axis of the deposit and through its center. A number of secondary lines were made perpendicular to the main line at 400 m intervals. The study sites were staked out at 100 m intervals. Depth measurements were made at 50 m intervals. The following surface characteristics were studied and recorded at each stake: The cover type and wetness of mire, the amount and height of peat mounds and the density, size and quality of trees. After that the peat deposit was sampled from the surface to the bottom to determine the type, fibrousity, wetness and the degree of humification of peat. The amount of snags in the deposit was determined by pushing a two metres long rod ten times into the ground. Laboratory samples were taken from selected sites to determine the pH value, ash content, sulphur content, heating value and bulk density of peat. Altogether 1 374 ha of mires were evaluated good for fuel peat production. This is 27 % of the surveyed area of 5 185 ha. The amount of useful peat is 22,30 million cubic metres in situ. The energy content is 43,08 million GJ or 11,99 million MWh.

30489 (GTK-TURVE–218) **The mires and their peat resources in Oulainen.** Virtanen, K.; Herranen, T. Geological Survey of Finland, Kuopio (Finland). 1988. 240p. (In Finnish). Order Number DE92562949. Source: OSTI; NTIS.

The Geological Survey of Finland has studied the area of 8 372 hectars of mires in the town of Oulainen. Majority of the mires with industrial interest were included in the study. This work is a part of the total inventory of the peat resources of Finland. The detailed surveys were made using line grids, where study sites were staked out at 100 meter intervals. The cover type, the peat type, the decomposition degree of peat and the substratum of mires were determined at each study site. Laboratory samples were taken from selected sites to determine the pH value, ash content, heating value, bulk density and sulphur content of peat (459 samples). The mires of Oulainen are both ombrotrophic bogs and minerotrophic fens. 58 % of the peat deposits is composed of Carex and 39 % of Sphagnum peat. Paludification have started in Oulainen area about 7000 years ago after the land had emerged from the Baltic sea due to the crust uplifting. The mires of Oulainen are quite shallow. On an average they are 0,9 m deep. of the surveyed mire area 17 % is over 1,5 m deep. The average ash content is 4,3 %, bulk density 102 kg/m^3 (in situ), the heating value 21,2 MJ/kg and the sulphur content 0,25 %. Altogether 1 250 ha of mires were evaluated suitable for peat production. The amount of useful fuel peat is 16 milj. m^3 in situ and the amount of useful horticultural peat is 0,6 milj. m^3 in situ. The energy content of fuel peat is 9 TWh on dry basis.

30490 (GTK-TURVE–219) **The mires and peat resources of the commune of Suonenjoki and their potential use.** Leino, J.; Silen, P. Geological Survey of Finland, Kuopio (Finland). 1988. 285p. (In Finnish). Order Number DE92562950. Source: OSTI; NTIS.

The Geologial Survey of Finland made a peatland study in the Commune of Suonenjoki in 1978 and 1985 - 1987. The study is a part of the total inventory of the peat resources of Finland. Sixty two mires were studied and they cover 4538 hectares. Most of the field work was carried out on survey line grids with study sites at the intervals of 100 meters. At each site the following determinations were made and recorded: cover type, wetness of mire, amount and height of peat hummocks, density, size and quality of trees, peat type, humification degree, fibrousness and wetness of peat and the number of stumps and snags in the deposits. The average depth of the mires investigated is 1,5 m. The average depth of the over one meter deep areas is 2,2 m. They cover about 2698 ha. The average degree of humification is 5,5. The structure of deposits vary much from one mire to another. 66 % of the peat deposits consists mainly of Sphagnum-peat and 34 % of Carex-peat. Altogether 582 samples were taken with a volumetric peat sampler for laboratory determinations. The average ash content is 4,3 % of dry matter. The average dry matter content of peat deposits is 93 kg per cubic meter of in situ peat. The average heating value of dry peat is 21,1 MJ/kg. The sulphur content of peat ash is mainly under 0,3 %. Altogether 1267 ha of peatland was evaluated as good for fuel peat production. The amount af fuel peat available is about 23 million cubic meters in situ.

30491 (GTK-TURVE–220) **Utilization of ADP in peat inventory and research.** Haenninen, P. Geological Survey of Finland, Espoo (Finland). 1988. 45p. (In Finnish). Order Number DE92562951. Source: OSTI; NTIS.

During the years 1981 - 1988 the Geological Survey of Finland has investigated about nine thousand peat bogs covering over one million hectares. Approximately 40 000 000 data were recorded in machinereadable form. In addition, the data on Finland's over 20 ha large peatlands (numbering 33 000) available on the base maps were collected for ADP file (15 data per bog). ADP has been used since 1975. Before 1975 all research has been handled manually. The results of the field and laboratory investigations are kept in files of three types according to the nature of the data. The form of the most central files are indexed and the record type is fixed. Large files, which contain the primary data of investigations, are in indexed files, which recortypes are variable. Two files, which contain the most important calculated values from the peat bogs, are direct access files. Indexed file type makes it possible to collect and group data quickly by means of defined retrieval keys. It is unnecessary for the user to know the location of data to be retrieved, since the program carries out all necessary collecting and prosessing of all the datas according to given keys. The whole routine output activities of the peatland data take approximately one and a half man-year, comprising the checking of c. 70 000 data sheets, and the output of 6 000 pages of numeric list and over 3 000 pictures.

30492 (GTK-TURVE–222) **The mires and their resources in Kiuruvesi.** Luukkanen, A.; Porkka, H. Geological Survey of Finland, Kuopio (Finland). 1988. 180p. (In Finnish). Order Number DE92562952. Source: OSTI; NTIS.

The Geological Survey of Finland surveyed the area of 4 458 hectares of mires in the municipality of Kiuruvesi during 1984 and 1987. The survey covered about 17 % of the total area of peatlands in Kiuruvesi. The field work was carried out by using a survey grid with study sites at the intervals of 100 meters. At each study site such features as botanical cover type, wetness of mire, density and quality of tree stand were determined first. Then the peat deposit was studied from the surface to the bottom. Peat type was determined according to its botanical origin and the degree of humification on von Post's ten scale. A volumetric peat sampler was used to take peat samples from selected sites to determine pH, water content, bulk density, heating value of peat, ash content and sulphur content. Some heavy metals and uranium were also recorded. The area of 770 hectares was considered good for fuel peat production. The quantity of usable peat is about 15,5 million cubic meters in situ. The energy content of the usable peat is about 32 million GJ or about 9,0 million MWh as calculated for dry peat.

30493 (GTK-TURVE–223) **The peat resources of seven peat deposits in the commune of Lestijaervi in Western Finland.** Korpijaakko, M.; Koivisto, M. Geological Survey of Finland, Kuopio (Finland). 1989. 65p. (In Finnish). Order Number DE92562953. Source: OSTI; NTIS.

One of tasks of the Geological Survey of Finland is to make an inventory of the peat resources of Finland. The main target is to map industrially useful peat deposits, but attention is payed also to the multiple use of mires such as conservation, regreation etc. Even though the inventory work is nation wide and the results bare consequently large importance, one partial report like this, has often only local importance.

30494 (GTK-TURVE–224) **The mires and their peat resources in Jaeppilae: Part 2 and summary.** Leino, J. Geological Survey of Finland, Kuopio (Finland). 1989. 118p. (In Finnish). Order Number DE92562954. Source: OSTI; NTIS.

The Geologial Survey of Finland studied peat resources in the commune of Jaeppilae in 1982-1986. 34 mires covering a total of 2334 hectares were studied. The study is a part of the total inventory of the peat resources of Finland. The main goal is to locate the peat resources with industrial interest. Emphasis is on fuel peat production. The mires studied contain a total of 31,8 million/m^3 of peat in situ. The average depth of the mires is 1,4 m and the average degree of humification is 5.3. The average depth of the over one meter deep areas is 2,2 m including the poorly humified Sphagnum predominant surface layer which averages 0,5 m in thickness. 76 % of the peat deposits consists mainly Sphagnum-peat and 24 % of Carex-peat. The majority of the mires are drained. The most common site type is cotton grass pine bog. Altogether 182 were taken from 12 mires for laboratory determinations. The average PH-value was 4,2 and ash content 3,4 %. The average dry matter content of peat deposits is 96 kg per cubic meter of in situ peat. The average calorific value of the dry peat is 21,5 MJ/kg. The sulphur content of peat ash is mainly under 0,3 %. The average melting point of peat ash was 1280 deg C. The total area suitable for fuel peat production is about 400 hectares. The available amount of peat is 6,6 million m^3 in situ and the energy countent at 50 % moisture 3,2 million MWh.

30495 (GTK-TURVE–225) **The peat resources of Aehtaeri and their potential use. Part 1.** Toivonen, T. Geological Survey of Finland, Espoo (Finland). 1989. 222p. (In Finnish). Order Number DE92562955. Source: OSTI; NTIS.

The Geological Survey of Finland studied peat resources in the town of Aehtaeri in 1986. 40 mires covering a total of 4025 hectares were studied. This is about 30 % of the total peatland area. The mires studied contain a total of 63,6 million m^3 of peat in situ. The mean depth of the mires is 1,60 m, including the poorly humified Sphagnum predominant surface layer, which averages 0,27 m in thickness. The mean humification degree (H) of the peat is 5.6. The area deeper than 2 m covers 1295 ha and contains 60 % of the total peat quantity (38.7 million m^3). Sixtythree per cent of the peat is Carex predominant, and the remaining 37 % Sphagnum predominant. The majority of the mires are drained. The most common site type is Sphaganum mire with pines. The average ash content of peat is 2.9 % of dry weight, the water content 91.8 % of wet weight, the dry bulk density 82 kg per m^3 situ and the sulphur content 0.21 % of dry weight. The effective calorific value of the dry peat is 21.4 MJ/kg. Twentyeight mires are suitable for fuel peat production; none of them are suitable for horticultural peat production. The total area suitable for fuel peat production is 1210 ha. The available amount of peat is 28.2 million m^3 in situ and the energy content at 50 % moisture 12.1 million MWh.

30496 (GTK-TURVE–226) **The peat resources of the municipality of Ilomantsi and their potentialities in fuel peat production. Part 1.** Saarelainen, J. Geological Survey of Finland, Kuopio (Finland). 1989. 202p. (In Finnish). Order Number DE92562956. Source: OSTI; NTIS.

The Geological Survey of Finland studied the mires and peat deposits in the municipality of Ilomantsi in 1987. The study is a part of the total inventory of the peat resources of Finland that Geological Survey is undertaking. The main goal of the study is to locate the peat resources with industrial interest Emphasis is on fuel peat production. However, also other ways to use mires are taken into account, including conservation and recreation. A detailed survey on a peatland was made using a survey line grid where the main line was run through the long axis of the deposit and through its center. A number of secondary lines were made perpendicular to the main line at 400 m intervals. The study sites were staked out at 100 m intervals. Depth measurements were made at 50 m intervals. The following surface characteristics were studied and recorded at each stake: The cover type and wetness of mire, the amount and height of peat mounds and the density, size and quality of trees. After that the peat deposit was sampled from the surface to the bottom to determine the type, fibrousity, wetness and the degree of humification of peat. The amount of snags in the deposit was determined by pushing a two meters long rod ten times into the ground. Laboratory samples were taken from selected sites to determine the pH value, ash content, sulphur content, heating value and bulk density of peat. Altogether 1 959 ha of mires were evaluated good for fuel peat production. This is 39 % of the surveyed area of 5 027 ha. The amount of useful peat is 42,79 million cubic metres in situ. The energy content is 75,43 million GJ or 20,96 million MWh.

30497 (GTK-TURVE–227) **The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 7.** Haenninen, P.; Hyvoenen, A. Geological Survey of Finland, Kuopio (Finland). 1989. 335p. (In Finnish). Order Number DE92562957. Source: OSTI; NTIS.

The Geologial Survey of Finland studied peat resources in the commune of Pudasjaervi in 1987. 58 mires covering a total of 20 315 hectares were studied. The study is a part of the total inventory of the peat resources in Finland. The main goal is to locate the peat resources with industrial interest. Emphasis is on fuel peat production. The field was carried out by using a survey grid with study sites at the intervals of 100 meters. At each study site the following determinations were made and recorded: The cover type and the wetness of mire, the amount and height of peat hummocks, size and quality of trees, peat type, humification degree and the number of stumps and snags in the deposits. The amount of snags in the deposit determined by pushing two meters long rod ten times into the ground. Laboratory samples were taken from selected sites to determine the pH value, water content, dry matter content, calorific value and ash content (1160 samples). Sulphur content was determined from 548 samples. Fiftysix of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 5463 hectares. The amount of useful peat is 92 million m^3 in situ and the energy content is 51 million MWh as calculated for dry peat or at 50 % moisture 45 million MWh.

30498 (GTK-TURVE–228) **The mires and peat resources of the commune of Isokyroe and their potential use. Part 1.** Suomi, T. Geological Survey of Finland, Kuopio (Finland). 1989. 72p. (In Finnish). Order Number DE92562958. Source: OSTI; NTIS.

Geological Survey of Finland investigated the quantity and quality of the industrially exploitable peatlands in the municipality of Isokyroe in 1984 and 1985. Altogether 1605 hectares of peatland were studied. This area covers 13 % of the municipalitys land area. The total peatland area suitable for fuel peat production is 132 hectares. Useful peat resources are 1,82 million m^3 in situ. The energy content equals to 0,69 million MWh as calculated for 50 % moisture content. The area suitable for horticultural peat production is 311 hectares, containing about 3,72 million m^3 of peat in situ. The average depth of peat deposits is l,4 m, including 0,7 m of slightly humified surfical layer. The total amount of peat of the studied peatlands is 22,62 million m^3. Area deeper than 2 m contains 8,72 million m or 39 % of the total reserves including 3,86 million m^3 of fuel peat. 75 % of the peat layers are Sphagnum predominant and rest of the peat is Carex predominant. The average net calorific value of dry peat is 19.8 MJ/kg and 8,7 MJ/kg when calculated for 50 % moisture content. The average bulk density of the samples is 83 kg/m^3 moisture content 91,5 % of wet weight, pH-value 3,9 and ash content 1,9 %.

30499 (GTK-TURVE–229) **The mires and peat resources of the commune of Utajaervi and their potential use. Part 4.** Pajunen, H. Geological Survey of Finland, Kuopio (Finland). 1989. 155p. (In Finnish). Order Number DE92562959. Source: OSTI; NTIS.

The Geologial Survey of Finland studied peat resources in the commune of Utajaervi in 1987. Fifteen mires covering a total of 6760 hectares were studied. The field was carried out by using a survey grid with study sites at the intervals of 100 meters. At each study site the following determinations were made and recorded: The cover type and the wetness of mire, the amount and height of peat hummocks, size and quality of trees, peat type, humification degree the number of stumps and snags in the deposits. Laboratory samples were taken from selected sites to determine the pH value, water content, dry matter content and ash content (696 samples). The calorific value was determined from 292 samples, sulphur content from 270 samples, melting reaction of ash from 47 samples and trace element contents from 62 samples. Thirteen of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 1231 hectares. The amount of useful peat is 21,85 million m^3 in situ and the energy content is 43,9 million GJ or 12,2 million MWh as calculated for dry peat.

30500 (GTK-TURVE–230) **The mires and peat resources of the commune of Simo in 1985-1986 and their potential use.** Muurinen, T. Geological Survey of Finland, Rovaniemi (Finland). 1989. 223p. (In Finnish). Order Number DE92562938. Source: OSTI; NTIS.

The Geologocal Survey of Finland made and inventory of peat resources in the commune of Simo in 1985-1986. Altogether 13 211 hectares of peatlands were surveyed. The main emphasis was to find peat for energy use. The field work was carried out using survey line grids with study sites at the intervals of 100 meters. At each site the following determinations were made and recorded: cover type, wetness of mire, amount and height of peat hummocks, density, size and quality of trees, peat type, humification degree, fibrousness and wetness of peat and the number of stumps and snags in the deposits. Altogether 858 peat samples were taken to the laboratory. The peat averages 4.7 % ash by dry weight and 90.1 % water by wet weight. It has an in situ dry bulk density 96kg/m^3. The net caloric value of the dry peat is 20.5 MJ/kg. Sulphur content of dry matter is 0.24 %. About 1 520 hectares of peatland with a minimum depth of 1,5 m was considered good for fuel peat production. The quantity of usable peat is 23.78 million m^3 in situ. The energy content of the usable peat is 41.56 million GT or 11.57 million MWh at the moisture content.

30501 (GTK-TURVE–231) **The peat recources of Ylaemaa and their usefulness.** Maekilae, M.; Grundstroem, A. Geological Survey of Finland, Espoo (Finland). 1989. 143p. (In Finnish). Order Number DE92562939. Source: OSTI; NTIS.

The geological Survey of Finland investigated the quantity and quality of the industrially exploitable peatlands in the municipality of Ylaemaa, southeastern Finland, during 1973, 1982, 1985 and 1986. Altogether 2 462 hectares of peatland were studied. This area covers 6.6 % of the land area. The total peatland area suitable for fuel peat production is 695 hectares. Useful peat resources are 17.48 million m^3 in situ. The energy content equals to 7.37 million MWh as calculated for 50 % moisture content. The area suitable for horticultural peat production is 435 hectares, containing aboat 5.43 million m^3 of peat in situ. The average net calorific value of dry peat is 21.2 MJ/kg and 9.4 MJ/kg when calculated for 50% moisture content. The average dry bulk density of samples is 78 kg/m^3 in situ, moisture content 92.0 % of wet weight, pH-value 4.6, ash content 2.8 % and sulphur content 0.20 % on dry basis.

30502 (GTK-TURVE–232) **The peat resources of Hankasalmi and their usefulness. Part 1.** Leino, J. Geological Survey of Finland, Kuopio (Finland). 1989. 123p. (In Finnish). Order Number DE92562940. Source: OSTI; NTIS.

Geological Survey of Finland investigated peatlands in the municipality of Hankasalmi during 1962, 1986-1988. Altogether 19 bogs covering a total area of 1 375 hectares were studied. The studied bogs contain about 22 million m^3 of peat in situ. 9 bogs are suitable for fuel peat production. The total area suitable for fuel peat production is 335 hectares and the available amount of peat is 6.8 million m^3 in situ and energy content at 35 % moisture is 3.4 million MWh.

30503 (GTK-TURVE–233) **The peat resources of seventeen peat deposits in the commune of Reisjaervi in Western Finland.** Korpijaakko, M.; Koivisto, M. Geological Survey of Finland, Kuopio (Finland). 1989. 114p. (In Finnish). Order Number DE92562941. Source: OSTI; NTIS.

The Geological Survey of Finland ivestigated 17 peatlands in the municipality of Reisjaervi. Altogether 3 795 hectares were studied. The total area suitable for peat production is 1 428 hectares and available amount of fuel peat is 23.32 million m^3 in situ. The energy content of usable peat is 12.94 million MWh on dry basis, at 35 %moisture 12.08 milliom MWh and at 50 % 11.40 million MWh.

30504 (GTK-TURVE–234) **Inventory of mires and peat resources, Parkano, Western Finland. Part 1.** Sten, C.G.; Svahnbaeck, L. Geological Survey of Finland, Espoo (Finland). 1989. 182p. (In Finnish). Order Number DE92562942. Source: OSTI; NTIS.

The Geological Survey of Finland studied peat resources in the town of Parkano, western Finland in 1980-83. Altogether 43 mires covering a total area of 4 280 hectares were studied. According to this peat inventory the most common site types are pine mires, (76 of the number of observations). Nineteen % of the study sites are in treeless mires, 3 % in hardwood-spruce mires and 7 in old peatland forests. The mires studied contain a total of 60.3 million m^3 of peat. Fifty four per cent of amount is Sphanum predominant and 46 % Carex predominant. The mean depth of the mires is 1.4 m including the slighty humified furface layer, which averages 0.3 m in thickness. The mean humification degree (H) of the peat is 5.8 (V. Post's scale). The average acidity (pH) of the peat samples tested in the laboratory is 4.4, the average ash content is 3.7 % of dry weight, the water content 90.1 % of wet weight and the bulk density 86 kg per m^3 in situ. The effective calorific value of the dry peat is 22.1 MJ/kg. Areas good for fuel peat production were found in 19 mires. They cover altogether 696 hectares. The average depth of the areas is 2.4 meters. The amount of useful peat is 16.4 million cubic meters in situ. The energy content of the fuel peat at 50 % moisture content is 28.1 million GJ or 7.8 million MWh. Horticultural peat was found in two peat bogs. The total area is 25 hectares with an average tichness of 1.3 m. The amount of horticultural peat is 0.3 million m^3 in situ.

30505 (GTK-TURVE–235) **The mires and their peat resources in Nilsiae.** Luukkanen, A. Geological Survey of Finland, Kuopio (Finland). 1989. 117p. (In Finnish). Order Number DE92562943. Source: OSTI; NTIS.

The Geological Survey of Finland surveyed the area of 1304 hectares of mires in municipality of Nilsiae during 1974,1984 and 1985. The survey covered about 36 % of the total area of peatlands in Nilsiae. The mires studied contain a total of 21.6 million m^3 of peat in situ. The mean depth of the bogs is 1.6 m and the mean degree of humification (1-10 scala) 5.0. The area deeper than 1.5 m covers 631 hectares and contains 78 % of the total peat quantity. Fifty-one per cent of the peat is Carex predominant and 44 % Sphagnum predominant. More than 2/3 (71 %) of the bogs are drained. The average ash content is 3.0 % of dry weight, the water content 90.6 % of wet weight, the dry bulk density 88 kg per m^3 in situ and the sulphure content 0.19 % of dry weight. The net calorific value of dry peat is 21.4 MJ/kg. The area of 442 hectares was considered good for fuel peat production. The quantity of useable peat is about 10.35 million cubic meters in situ. The energy content of usable peat is about 18.3 million GJ or about 5.1 million MWh as calculated for dry peat.

30506 (GTK-TURVE–236) **The peat resources and their potential use in Kihnioe, Western Finland.** Sten, C.G.; Toivonen, T. Geological Survey of Finland, Espoo (Finland). 1990. 158p. (In Finnish). Order Number DE92562944. Source: OSTI; NTIS.

The Geological Survey of Finland studied peat resources in the municipality of Kihnioe in 1981-1982 and 1984. 33 mires covering a total of 2 790 hectares were studied. This is about 29 % of the total peatland area of Kihnioe. The mires studied contain a total of 30.7 million m^3 of peat in situ. The mean depth of the mires is 1.10 m, including the poorly humified Sphagnum predominant surface layer, which averages 0.26 m in thickness. The mean humification degree (H) of the peat is 5.8. The area deeper than 2 m covers 378 hectares and contains 33 % of the total peat quantity (10.12 million m^3). Fifty-five per cent of the peat is Carex predominant, and the remaining 45 % Sphagnum predominant. The majority of the mires are drained. The most common site type is cotton grass pine bog. The average ash content of peat is 3.1 % of dry weight, the water content 90.1 % of wet weight, the dry bulk density 97 kg per m^3 in situ and the sulphur content 0.18 % of dry weight. The effective caloric value of the dry peat is 21.6 MJ/kg. Twelve of the investigatted mires are suitable for fuel peat production ; none of then are suitable for horticultural peat production. The total area suitable for fuel peat production is 229 hectares. The available amount of peat is 4.28 million m^3 in situ and energy content at 50 % moisture 2.17 million MWH.

30507 (GTK-TURVE–237) **The mires and their peat resources in Liminka, Lumijoki and Temmes.** Virtanen, K.; Herranen, T. Geological Survey of Finland, Kuopio (Finland). 1990. 149p. (In Finnish). Order Number DE92562945. Source: OSTI; NTIS.

The Geological Survey of Finland has studied the area of 15 049 hectares of mires in the municipalities of Liminka, Lumijoki and Temmes. Majority of the mires with industrial intrest were included in the study. This work is a part of the total inventory of the peat resources of Finland. The detailed surveys were made using line grids, where study sites were staked out at 100 meter intervals. The cover type, the peat type, the decomposition degree of peat and the substratum of mires were determined at each study site. Laboratory samples were taken from selected sites to determine the pH value, ash content, heating value, bulk density and sulphur content of peat. The mires of Liminka, Luminjoki and Temmes are both ombrotrophic bogs and minerotrophic fens. Fifty per cent of the peat deposits is composed of Carex and 49 % of Sphagnum peat. Paludification have started in Liminka, Lumijoki and Temmes area after the land had emerged from the Baltic sea due to the crust uplifting. The mires of these municipalities are quite shallow. On the average they are 0.8 m deep. Of the surveyed mire area 12 % is over 1.5 m deep. Altogether 356 hectares of mires were evaluated suitable for peat production. The amount of useful fuel peat is 4 million m^3 in situ. The energy content of fuel peat is 2.6 TWh on dry basis.

30508 (GTK-TURVE–238) **The mires and their peat resources in Outokumpu. Part 1.** Leino, J.; Saarelainen, J. Geological Survey of Finland, Kuopio (Finland). 1990. 170p. (In Finnish). Order Number DE92562946. Source: OSTI; NTIS.

The Gelogical Survey of Finland has studied mires in the commune of Outokumpu in the years 1976 and 1986-88. Altogether 22 bogs covering a total area of 2 900 hectares were studied. 12 bogs are suitable for fuel peat production. The suitable area is 800 hectares. The available amount of peat is 13 million m^3 in situ and the energy content at 50 % moisture is 7.2 million MWh.

30509 (GTK-TURVE–239) **Inventory of mires and peat resources in Simo. Part 2.** Muurinen, T. Geological Survey of Finland, Rovaniemi (Finland). 1990. 253p. (In Finnish). Order Number DE92562947. Source: OSTI; NTIS.

The Geological Survey of Finland made an inventory of peat resources in the commune of Simo in 1987-88. Altogether 9 613 hectares of peatlands were surveyed. The main emphasis was to find peat for energy use. The field work was carried out using survey line grids with study sites at intervals of 100 meters. At each site the following determinations were made and recorded: cover type, wetness of mire, amount and height of peat hummocks, density, size and quality of trees, peat type, humification degree, fibrousness and wetness of peat and the number of stumps and snags in deposits. Altogether 837 peat samples were taken to the laboratoty. The averange ash content is 4,9 per cent by dry weight and water content 90.2 % by wet weight. The net caloric value of the dry peat is 20.3 MJ/kg. Sulphur content of dry matter is 0.28 %. The total area suitable for fuel peat production is 892 hectares. The quantity of usable peat is 12.07 million m^3 in situ. The energy content of the usable peat is 5.91 million MWh at the 50 % moisture content.

30510 (GTK-TURVE–240) **The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 8.** Haenninen, P.; Hyvoenen, A. Geological Survey of Finland, Kuopio (Finland). 1990. 417p. (In Finnish). Order Number DE92562961. Source: OSTI; NTIS.

The Geologial Survey of Finland studied peat resources in the commune of Pudasjaervi in 1988. 67 mires covering a total of 20 430 hectares were studied. The study is a part of the total inventory of the peat resources in Finland. The main goal is to locate the peat resources with industrial interest. Emphasis is on fuel peat production. The field was carried out by using a survey grid with study sites at the intervals of 100 meters. At each study site the following determinations were made and recorded: The cover type and the wetness of mire, the amount and height of peat hummocks, size and quality of trees, peat type, humification degree and the number of stumps and snags in the deposits. Laboratory samples were taken from selected sites to determine the pH value, water content, dry matter content, calorific value and ash content (1060 samples). Only ash content was determined from fifteen samples. Sulphur content was determined from 333 samples. Sixtyone of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 4131 hectares. The amount of useful peat is 72 million m^3 in situ and the energy content is 37 million MWh as calculated for dry peat and at 50 % moisture 33 million MWh.

30511 (GTK-TURVE–241) **The mires and peat resources of the commune of Utajaervi and their potential use. Part 5.** Pajunen, H. Geological Survey of Finland, Kuopio (Finland). 1990. 146p. (In Finnish). Order Number DE92562962. Source: OSTI; NTIS.

The Geologial Survey of Finland studied peat resources in the commune of Utajaervi in 1988. Eighteen mires covering a total of 5470 hectares were studied. The field was carried out by using a survey grid with study sites at the intervals of 100 meters. At each study site the following determinations were made and recorded: The cover type and the wetness of mire, the amount and height of peat hummocks, size and quality of trees, peat type, humification degree, the number of stumps and snags in the deposits. Laboratory samples were taken from selected sites to determine the pH value, water content, dry matter content and ash content. The calorific value and sulphur content were determined from 191 samples and trace element content from 58 samples. Sixteen of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 1290 hectares. The amount of useful peat is 24,57 million m^3 in situ and the energy content is 45,6 million GJ or 12,7 million MWh as calculated for dry peat.

30512 (GTK-TURVE–242) **The peat resources of Kuortane and their potential use.** Toivonen, T. Geological Survey of Finland, Espoo (Finland). 1990. 213p. (In Finnish). Order Number DE92562963. Source: OSTI; NTIS.

The Geological Survey of Finland studied peat resources in the municipality of Kuortane in 1987 and 1988. 44 mires covering a total of 4630 hectares were studied. This is about 66,5 % of the total peatland area. The mires studied contain a total of 64.19 million m^3 of peat in situ. The mean depth of the mires is 1,39 m, including the poorly humified Sphagnum predominant surface layer, which averages 0,32 m in thickness. The mean humification degree (H) of the peat is 5.7. The area deeper than 2 m covers 1114 ha and contains 24 % of the total peat quantity (29.85 million m^3). Sixty-five per cent of the peat is Sphagnum predominant, and the remaining 35 % Carex predominant. The majority of the mires are drained. The most common site type is cotton grass pine bog. The average ash content of peat is 2,8 % of dry weight, the water content 90,1 % of wet weight, the dry bulk density 100 kg per m^3 in situ and the sulphur content 0,20 % of dry weight. The effective calorific value of the dry peat is 20,7 MJ/kg. Twenty-one of the investigated mires are suitable for fuel peat production; three of them are suitable for horticultural peat production. The total area suitable for fuel peat production is 1124 ha. The available amount of peat is

20.56 million m^3 in situ and the energy content at 50 % moisture 10.5 million MWh.

30513 (GTK-TURVE–243) **The mires and their potentialities in peat production in the municipality of Ilomantsi.** Suomi, T. Geological Survey of Finland, Kuopio (Finland). 1991. 156p. (In Finnish). Order Number DE92562964. Source: OSTI; NTIS.

Geological Survey of Finland investigated the quantity and quality of the industrially exploitable peatlands in municipality of Ilomantsi in 1988. Altogether 4 739 hectares of peatland were studied. The study is a part of the total inventory of the peat resources of Finland that Geological Survey is undertaking. Peat deposits were studied to determine the type and humification of peat. For example the cover type and wetness of mire were also studied, amount of snags in the deposits and size and quantity of trees. Laboratory samples were taken from selected sites to determine the pH value, ash content, sulphur content, heating value and bulk density of peat. The average depth of peat deposits is 2,2 m, including 0,4 m of slightly humified surfical layer. The amount of peat of the studied peatland is 105,29 milj. m^3. The average net calorific value of dry peat is 21,1 MJ/kg, bulk density 83 kg/m^3 in situ, moisture content 91,6 % of wet weight and pH value 4,4. The average ash content is 2,9 % and sulphur content 0.30 % on dry bases. The total peatland area suitable for fuel peat production 1 127 hectares. Useful peat resources are 27,054 milj. m^3 in situ. The energy content is 47,952 milj. GJ or 13,331 milj. MWh as calculated for dry peat.

30514 (GTK-TURVE–244) **The peat resources of seventeen peat deposits in the commune of Kannonkoski in Central Finland.** Koprijaakko, M. Geological Survey of Finland, Kuopio (Finland). 1991. 71p. (In Finnish). Order Number DE92562965. Source: OSTI; NTIS.

One of the tasks of the Geological Survey of Finland is to make an inventory of the peat resources of Finland. The main target is to map industrially useful peat deposits, but attention is paid also to the multiple use of mires, like conservation, regreation etc.

30515 (GTK-TURVE–245) **The peat resources of Toeysae and their potential use.** Toivonen, T. Geological Survey of Finland, Espoo (Finland). 1991. 110p. (In Finnish). Order Number DE92562966. Source: OSTI; NTIS.

The Geological Survey of Finland studied peat resources in the municipality of Toeysae 1988. 24 mires covering a total of 1382 hectares were studied. This is about 67 % of the total peatland area. The mires studied contain a total of 21.61 million m^3 of peat in situ. The mean depth of the mires is 1.3 m, including the poorly humified Sphagnum predominant surface layer, which averages 0.3 m in thickness. The mean humification degree (H) of the peat is 5.7. The area deeper than 2 m covers 427 ha and contains 31 % of the total peat quantity (12.66 million m^3). Fifty-seven per cent of the peat is Carex predominant, and the remaining 43 % Sphagnum predominant. The majority of the mires are drained. The most common site type is cotton grass pine bog. The average ash content of peat is 3.1 % of dry weight, the water content 91.1 % of wet weight, the dry bulk density 92 kg per m^3 in situ and the sulphur content 0.15 % of dry weight. The effective calorific value of the dry peat is 21.3 MJ/kg. Thirteen of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 263 ha. The available amount of peat is 5.68 million m^3 in situ and the energy content at 50 % moisture 2.82 million MWh.

30516 (GTK-TURVE–246) **The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 9.** Haenninen, P.; Hyvoenen, A. Geological Survey of Finland, Kuopio (Finland). 1991. 141p. (In Finnish). Order Number DE92562967. Source: OSTI; NTIS.

The Geologial Survey of Finland studied peat resources in the commune of Pudasjaervi in 1989. Seventeen mires covering a total of 6785 hectares were studied. The study is a part of the total inventory of the peat resources in Finland. The main goal is to locate the peat resources with industrial interest. Emphasis is on fuel peat production. The field was carried out by using a survey grid with study sites at the intervals of 100 meters. At each study site the following determinations were made and recorded: The cover type and the wetness of mire, the amount and height of peat hummocks, size and quality of trees, peat type, humification degree and the number of stumps and snags in the deposits. The amount of snags in the deposit determined by pushing two meters long rod ten times into the ground. Laboratory samples were taken from selected sites to determine the pH value, water content, dry matter content, calorific value and ash content (410 samples). Only ash content was determined from five samples. Sulphur content was determined from 189 samples. Fourteen of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 1655 hectares. The amount of useful peat is 28 million m^3 in situ and the energy content is 13 million MWh as calculated for dry peat or at 50 % moisture 33 million MWh.

30517 (GTK-TURVE–247) **The peat resources of Aehtaeri and their potential use. Part 2.** Toivonen, T. Geological Survey of Finland, Espoo (Finland). 1991. 197p. (In Finnish). Order Number DE92562968. Source: OSTI; NTIS.

The Geological Survey of Finland studied peat resources in the town of Aehtaeri in 1987 and 1988. 53 mires covering a total of 3464 hectares were studied. This is about 24 % of the total peatland area. The mires studied contain a total of 54 66 million m^3 of peat in situ. The mean depth of the mires is 1.6 m, including the poorly humified Sphagnum predominant surface layer, which averages 0.3 m in thickness. The mean humification degree (H) of the peat is 5.9. The area deeper than 2 m covers 1092 ha and contains 58 % of the total peat quantity (31.56 million m^3). Fifty-five per cent of the peat is Carex predominant, and the remaining 45 % Sphagnum predominant. The majority of the mires are drained. The most common site type is cotton grass pine bog. The average ash content of peat is 3.3 % of dry weight, the water content 91.4 % of wet weight, the dry bulk density 86 kg per m^3 in situ and the sulphur content 0.18 % of dry weight. The effective calorific value of the dry peat is 21.4 MJ/kg. Eighteen of the investigated mires are suitable for fuel peat production. The total area suitable for fuel peat production is 467 ha. The available amount of peat is 10.86 million m^3 in situ and the energy content at 50 % moisture 5. l million MWh.

0120 Mining

Refer also to citation(s) 30470, 30588, 31652, 31722

0130 Transport, Handling, and Storage

30518 (CONF-9110369–, pp. 1-3) **Experimental apparatus for the study of flowing granular materials.** Hanes, D.M. (Univ. of Florida, Gainesville (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

The processes causing momentum transfer in an assembly of flowing granular particles have been simply characterized as (1) sliding friction between particles experiencing enduring contact, (2) interparticle collisions during periods of brief contact, and (3) particle translation. Various experimental apparatus have been constructed in order to measure the Macroscale relationships between stress, volume fraction, and bulk deformation (or rate of deformation). The motions of individual particles within the flow typically has not been measured. Correspondingly, these apparatus do not directly measure or distinguish between the different mechanisms for momentum transfer. The apparatus geometry and material construction impose significant constraints which strongly influence the flow dynamics. In this paper, shear cells will be compared and contrasted with inclined chutes, with respect to flow dynamics.

30519 (CONF-9110369–, pp. 34-40) **Multiphase flow studies by NMR with application to granular flows.** Altobelli, S.A. (Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM (United States)); Caprihan, A.; Fukushima, E.; Nakagawa, M.; Givler, R.C. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Nuclear magnetic resonance (NMR) has been used for nearly four decades to study chemical properties of materials. It has been known for an even longer time that NMR signals are affected by sample motion, both at large and small scales. It is only recently, however, that the relatively new techniques of NMR imaging (MRI) has been combined with the NMR physics of flowing spins to yield two- and three-dimensional velocity and concentration information of multiphase flows. In this note, the authors first summarize the measurements that they have made in multiphase flows followed by a description of a new application of NMR flow imaging, i.e., preliminary experiments on granular flows.

30520 (CONF-9110369--, pp. 41-50) **Fluidization of particles in horizontal slurry flow.** Campbell, C.S. (Univ. of Southern California, Los Angeles (United States)); Avila-Segura, F.E.; Yang, Y. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

There are two mechanisms by which large settling solid particles may be kept in a fluidized state in a horizontal slurry flow. These are (1) by particle-particle interactions, as in a dry granular flow, or (2) by particle-fluid interactions as when the particles become entrained in the fluid turbulence. The original goal of this study is to determine to what extent each mechanism fluidizes the solid material. The first round of results, reported in Campbell and Avila-Segura (1990) indicate that the flow type, whether heterogeneous or homogeneous, is determined by the dominant fluidization mechanism. This explains something why some criteria for determining whether the flow will be heterogeneous or homogeneous depends only on particle properties and not on any flow conditions; large heavy particles are relatively immune to fluid forces and will fluidized themselves like a dry granular material exhibiting heterogeneous behavior while small light particles are dominated by fluid forces and experience homogeneous behavior. An intriguing part of this study was that, at large flow velocities, there is an unexpected interaction force that tends to drive particles toward the walls. In some sense, one can argue that, under these conditions, the fluid is not supporting the particles, but the particles are supporting the fluid. Preliminary experiments with a velocity/density/pressure probe indicate that some sort of lift force is responsible for this phenomenon.

30521 (CONF-9110369--, pp. 51-78) **Using the refractive index matched technique to study the flow properties of slurries.** Wildman, D.J. (Pittsburgh Energy Technology Center, PA (United States)); Ekmann, J.M.; Kadambi, J.R.; Chen, R.C. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Since most concentrated slurries are opaque, velocity profiles are difficult to measure with modern light scattering instrumentation. Recently, the refractive index matching technique has been used to prepare solid-liquid mixtures in which the particle and liquid refractive indices are the same, making the slurry transparent. Non-intrusive laser light scattering techniques, e.g. Laser Doppler Velocimetry (LDV) , have been used to measure velocity profiles along horizontal and vertical diameters of refractive index matched (RIM) solid-liquid mixtures. In this study LDV is used to measure liquid and solid axial velocity profiles for slurries with solids loadings as great as 25 volume percent. Axial velocity profiles were measured during flow through straight horizontal pipe and through concentric contractions. These results are presented and compared. These same solid-liquid mixtures have been rheologically characterized. Yield stresses and shear thinning behavior have been observed in mixtures with solids loadings of 15 volume percent or greater. The theoretical analyses of Hanks and Dadia and Hanks and Ricks were applied to the flow data through the constant-diameter pipe where appropriate. The effect of the rheological properties on the flow properties through horizontal, constant-diameter pipe and a concentric contraction geometry are discussed.

30522 (CONF-9110369--, pp. 79-93) **Visualization of the wall-slip layer in bounded flows of suspensions.** Krishnan, G. (Univ. of Notre Dame, IN (United States)); Leighton, D.T. Jr. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

In this paper the authors present preliminary results of their investigation into the behavior of the layer of particles next to a wall. In the next section they describe a simple theory which predicts the velocity of the solid phase in the vicinity of a rigid wall in a sheared suspension. For dilute suspensions they take into account the exact interaction between a particle and a wall, and extend this to concentrated suspensions through a simple effective medium theory/force balance on the layer of particles next to the wall. In the third section they describe their experimental flow visualization efforts. They are able to examine the wall slip layer directly at distances less than one radius from the wall by observing the motion of inclusions in the interior of the particles. In the final section the preliminary results of the experiments are compared with previous experiments and to the simple model of wall slip to gain insight into the behavior of suspensions next to the wall.

30523 (CONF-9110369--, pp. 94-108) **Methodology of a radiosonde system for the non-intrusive tracking of a particle in a flow.** Rosato, A.D. (New Jersey Inst. of Tech., Newark (United States)); Dave, R.N.; Fischer, I.S.; Carr, W.N. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

A scheme for tracking the individual trajectory of a particle within a mass of particles flowing down an inclined chute is described. The method consists of mounting within a test particle a set of subminiature radiosonde transmitters along with a power supply. Radio signals from the transmitters are received by antennae mounted along the chute and the data is processed to indicate the displacement and orientation of the particle.

30524 (CONF-9110369--, pp. 109-135) **Optical imaging systems for two phase flow.** Liu, Z.C. (Univ. of Illinois, Urbana (United States)); Adrian, R.J. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Particle image velocimetry and particle tracking velocimetry are useful new methods for the study of dilute or optically thin two phase flows. Under proper conditions they can be combined to measure simultaneously the Lagrangian particle velocities and the fluid velocity field in which the particles (or droplets or bubbles) are immersed. Although the present discussion focused on 2-D snapshots of the flow, extensions to 3-D and time varying flow are feasible and currently under development.

30525 (CONF-9110369--, pp. 182-194) **Rapid granular shear flows driven by identical, bumpy, frictionless boundaries.** Jenkins, J.T. (Cornell Univ., Ithaca, NY (United States)); Askari, E.

USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Rapid flows of granular materials commonly occur in natural phenomena such as rock slides, debris flows, granular snow avalanches and underwater sediment slumps, and in industrial processes involving the rapid transport of bulk materials, for example, coal, ore, cereals, and pharmaceuticals. The common features in these diverse flows is that the grains interact with each other through collisions and that these collisions are responsible for the transfer of momentum and the transfer and dissipation of energy in the flow. Momentum and energy are supplied to a flow by gravity and by shear and normal forces applied at its boundaries. The interest, of course, is in predicting the relationship between the forces applied to a flow and its speed and extent. The paper describes field equations, constitutive relations, boundary conditions, steady gap thickness, the velocity, graphical results, and relevance.

30526 (CONF-9110369–, pp. 211-235) **Computational modeling of granular flow dynamics: Clustering instability in granular gases.** Goldhirsch, I. (Cambridge Hydrodynamics, Inc., Princeton, NJ (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

It is shown that a collection of particles interacting inelastically tends to form clusters of high density and low internal kinetic energy interspersed with energetic dilute regions. The mechanism which is responsible for the creation of clusters is a nonlinear instability involving the interplay of long wavelength shear modes and local dissipative cooling. The source of this instability is demonstrated using simplified equations of motion. Typical cluster separations as well as the minimal system size necessary for the onset of the instability are obtained. In an unforced gas, the model also predicts the time scale following which significant clustering is expected. The above-mentioned results compare well with two dimensional numerical simulations of colliding discs. Implications concerning constitutive relations for granular materials are discussed.

30527 (CONF-9110369–, pp. 236-253) **Statistical mechanical theory of inelastic granular systems.** Oppenheim, I. (Massachusetts Inst. of Tech., Cambridge (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

A statistical mechanical theory of inelastic granular systems is formulated using projection operator techniques. The theory is based on the fact that each granular particle has many interacting internal degrees of freedom which, except for very short times, remain at equilibrium at a very low temperature. These degrees of freedom provide a sink for the translational relative momenta and lead to clustering of the particles.

30528 (CONF-9110369–, pp. 287-298) **Granular flows down bumpy inclines.** Richman, M.W. (Worcester Polytechnic Inst., MA (United States)); Martin, R.E. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. DOE Contract AC22-91PC90185. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

The authors are concerned here with steady, fully developed, gravity-driven flows of smooth, identical spheres down bumpy inclines. They summarize the analysis of these flows carried out by Richman and Marciniec [1990], who employed a kinetic constitutive theory and replaced the solid volume fraction by its depth-averaged value wherever it occurred in the balance equations. In the same manner, they obtain approximate closed form expressions for the normal stress, shear stress, and granular temperature, which when employed in the constitutive relations determine the solid volume fraction and mean velocity profiles. They then reparameterize the solutions to obtain, for fixed angles of inclination and boundary characteristics, the variations of mass flow rate with mass-hold up. In addition, they determine the corresponding variations of flow depth, depth-averaged solid volume fraction, and depth-averaged mean velocity. With the results presented in this manner, it is easy to make qualitative comparisons between predictions made by the theory and experimental results obtained by Johnson et. al. [1990].

30529 (CONF-9110369–, pp. 299-309) **A theoretical and numerical study of the flow of granular materials.** Rajagopal, K.R. (Univ. of Pittsburgh, PA (United States)); Gudhe, R. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

In recent years there has been considerable interest in understanding the behavior of granular materials as it has bearing on several technologically significant problems such as the handling of coal powder, grain, ore, crushed oil shale, sand and other particulate solids, the process of fluidization of coal particles and its effect on combustion, and the mechanics of avalanches and other natural disasters which involve the flow of powders and bulk solids. Modeling granular materials would require a fusion of ideas from both solid and fluid mechanics. Moreover, granular materials exhibit phenomena like normal stress differences in simple shear flow, characteristic of non-Newtonian fluids and non-linearly elastic solids. To model the mechanics of granular materials various investigators have proposed models, which can be classified under two categories, those that are derived on the basis of kinetic theory approach and the others based on a continuum approach. The authors consider the flow of granular materials down an inclined plane modeled by the constitutive equations proposed by Jenkins and Richman [1985]. This problem was solved by making approximation that the field variable could be replaced by the average value, over the height, of the field variable. This simplified the problem tremendously and made it possible for Richman and Marciniec [1990] to obtain exact solutions. Here, the authors investigate how close these exact solutions really are to the solutions of the full equation.

30530 (CONF-9110369–, pp. 316-346) **Dense transport and fluidization of solids using kinetic theory.** Gidaspow, D. (Illinois Inst. of Tech., Chicago (United States)); Bezbaruah, R.; Miller, A. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. DOE Contract FG22-89PC89769. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Quantitative understanding of the hydrodynamics of fluidization and transport of solids is needed for the design and scale-up of efficient new reactors in the petroleum, chemical and in the electric power industries. For example, although bubbling fluidized bed combustors have reached a commercial status, an understanding of solids motion and its effect on erosion of the heat exchanger tubes immersed in fluidized beds remains inadequate. Hydrodynamic models have been developed that have the potential of predicting erosion patterns in fluidized beds. These two fluid models are a generalization of the celebrated Navier-Stokes equations used in single-phase fluid mechanics. It has been shown that these models, with zero gas and solids viscosities, were able to predict a great deal of the behavior of bubbling beds because the dominant mechanism of energy dissipation is the drag between the particles and the fluid. The paper discusses hydrodynamic models, the kinetic theory model, and simulation of loop flow using a new kinetic theory. It is concluded that direct numerical simulation of coupled Navier-Stokes equations can be used to compute the structure and turbulence of gas-solid transport. However, in the kinetic theory model the restitution coefficients must be determined empirically.

30531 (CONF-9110369–, pp. 347-355) **Numerical simulation of inclined chute flows of monodisperse, inelastic, frictional spheres.** Walton, O.R. (Lawrence Livermore National Lab., CA (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. DOE Contract W-7405-ENG-48. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Molecular-dynamics-like simulations are utilized to map regions of flow parameter space where steady flows occur for monodisperse assemblies of inelastic, frictional spheres, flowing down frictional, inclined planar surfaces. The trajectory-following technique utilizes nearly- rigid particles interacting via contact forces and gravity. Energy losses in the simulations occur only via displacement-dependent hysteretic loading/unloading paths and sliding friction. Initial scoping calculations are examining flows on an incline tilted 17 degrees from the horizontal, determining the boundaries of various flow regimes. Assemblies of inelastic spheres with interparticle friction coefficients less than the tangent of the inclination angle accelerate unboundedly. Those with friction coefficients somewhat greater than the tangent of the inclination angle develop steady velocity and density profiles for a variety of flow depths but result in arrested flow for coefficients of friction greatly exceeding the inclination angle tangent (e.g. by more than a factor of 2). Conversely, a significant range of inclination angles is expected to exist that will result in steady flows for a given set of assembly properties.

30532 (CONF-9110369–, pp. 356-363) **Dynamic simulation of pressure driven suspension flow.** Nott, P.R. (California Inst. of Tech., Pasadena (United States)); Brady, J.F. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

To better understand the behavior of suspension transport, the authors have numerically simulated the pressure driven channel flow of a suspension of particles by Stokesian dynamics. The interest in channel flow is twofold. First, in many situations of suspension transport pressure- as opposed to shear-driven flows occur, and so simulations of microstructure, phase slip and pressure drop are of intrinsic interest. Second, from a fundamental perspective, in a pressure-driven flow the suspension is subject to inherently inhomogeneous stress and shear fields; the stress and shear rate vary from zero at the centerline to a maximum at the walls. The question is, Do inhomogeneous flows give rise to new physics? That is, because of the finite size of the particles and the fact that their motion is hydrodynamically driven do particles migrate and produce their own intrinsic concentration inhomogeneities? This question has obvious implications for suspension transport.

30533 (CONF-9110369–, pp. 364-367) **Dynamical simulations of sedimentation.** Ladd, A.J.C. (Lawrence Livermore National Lab., CA (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. DOE Contract W-7405-ENG-48. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

In previous work the author has developed a numerical technique for computing the hydrodynamic interactions between suspended solid spheres. By averaging appropriate elements of the mobility matrix over random (non-overlapping) configurations of hard spheres, the high-frequency or short-Lime hydrodynamic transport coefficients can be calculated; the results are in excellent agreement with experiment. During sedimentation, microstructural rearrangements take place; thus the steady-state sedimentation velocity can differ from its initial value. Moreover the suspension does not sediment as a homogeneous unit; rather there is a substantial dispersion of the particle velocities due to microscopic inhomogeneities in particle position. In this paper results arising from the dynamical simulation of sedimenting spheres are presented; the author limits himself to results at a single packing fraction, $\phi = 0.05$, to compare with the experimental results of Ham and Homsy.

30534 (CONF-921110–6) **On development of a three-dimensional particle motion tracking system.** Dave, R.N.; Ashok, A.S.; Bukiet, B.G. New Jersey Inst. of Tech., Newark, NJ (United States). [1992]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90181. From Winter annual meeting of the American Society of Mechanical Engineers; Anaheim, CA (United States); 8-13 Nov 1992. Order Number DE92015846. Source: OSTI; NTIS; GPO Dep.

Development of a non-intrusive particle tracking technique is considered. Evaluation of the existing methods show that they are not suitable for three-dimensional motion tracking. A novel system based on the principle of magnetic induction coupling is presented. This technique can be used to track the position and orientation of a single particle in a three-dimensional flow of a mass of particles. The system consists of two or more small transmitters, powered by small batteries, mounted inside the particle, and six or more receivers which acquire the induced voltages. This paper presents details of the techniques used to derive the position and orientation information from the voltages induced in the receivers. The feasibility of the proposed technique is established through simulated and actual experiments. Practical issues such as the effect of signal noise are considered. The technique presented here has a wide range of applications due to its non-intrusive nature, and is particularly useful when optical techniques are not feasible. Directions for future work are provided.

30535 (DOE/PC/90182–T5) **Studies of granular flow down an inclined chute: Quarterly technical progress report, March 13, 1992–June 12, 1992.** Hanes, D.M. Florida Univ., Gainesville, FL (United States). [1992]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90182. Order Number DE92018871. Source: OSTI; NTIS; GPO Dep.

A preliminary series of experiments were run in order to examine the effects sidewalls have on the steady-state mass flow rate of granular material in a rectangular, inclined chute. These experiments also serve to assess the problems associated with the initial operation of the granular flow apparatus. Presumably, the friction between the sidewalls and the flowing material will slow the flow rate of that material. The relative effect of the sidewalls should decrease with increasing width for a given flow entrance condition. For instance, when the width of the chute is at a minimum (one grain diameter), the sidewalls will have a maximum frictional effect. And as the width approaches infinity, the sidewalls will have a minimum frictional effect. It is desired to know at what chute widths the sidewall effects will reasonably approach this minimum, if this condition can even be approached with the existing apparatus. The relationship between chute width and flow rate will be important to know during more involved experiments which will follow this initial investigation. These experiments will include the measurement of localized grain density, local velocity and individual grain dynamics (rotation and translation) and collisions. The secondary objective, to observe and correct problems with the system, is a more general and qualitative goal.

30536 **Method and apparatus for transporting liquid slurries.** Berry, G.F.; Lyczkowski, R.W.; Wang, Chi-Sheng. To Dept. of Energy. 1991. USA Patent patent application 7-642,270. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92019832. Source: OSTI; NTIS; GPO Dep.

An improved method and device to prevent erosion of slurry transport devices is disclosed which uses liquid injection to prevent contact by the slurry composition with the inner surface of the walls of the transport system. A non-abrasive liquid is injected into the slurry transport system and maintains intimate contact with the entire inner surface of the transport system, thereby creating a fluid barrier between the nonabrasive liquid and the inner surface of the transport system which thereby prevents erosion.

30537 (WAES-TR–92-0004) **Research and development for storage, transport, and handling of coal-based fuels: Final report.** Cooper, M.H. (Westinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Systems Dept.); Woodle, B.M.; Ivanenok, J. III; Canton, M.H.; Yang, W.C.; D'Amico, N.; Klinzing, G.E.; Chiang, S.H.; Weintraub, M.; Rastogi, S.; Dhodapkar, S.V.; CabWestinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Systems Dept.; Pittsburgh Univ., PA (United States). Dept. of Chemical and Petroleum Engineering. 28 Apr 1992. 208p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89797. Order Number DE92018093. Source: OSTI; NTIS; GPO Dep.

Technology requirements for storage, transport, and handling of dry, ultra-fine coal (DUC) have been experimentally investigated including storage systems, powder characteristics, explosibility, and pneumatic transport. Total logistic costs from the processing plant to the user for DUC ranged from a high of $246.90 per ton for low capacities with truck transport to $33.75 per ton for high capacities with barge transport.

0140 Combustion

Refer also to citation(s) 30419, 30432, 30433, 30434, 30474, 30476, 30477, 30478, 30479, 30480, 30481, 30482, 30529, 30530, 30554, 31070, 31071, 31223, 31408, 32522

30538 (AAA-REP–89-4) **Reaction kinetics of coal combustion: A literature review.** Koskinen, H. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1990. 87p. Order Number DE92562974. Source: OSTI; NTIS.

A literary study of the progress within the area of coal combustion during the last ten years has been made. An allcomprehensive presentation of this subject is impossible because of the great number of reports published during the last years. The choice of the articles presented in this review is purely subjective with the aim of describing the combustion mechanisms in a uniting way. The main emphasis of the study has been put on the heterogeneous reactions of coal particles during combustion. Such phenomena as gas phase reactions connected to coal combustion and all other bireactions as well as catalytical effects involved the combustion mechanism have been left out of this study. The purpose of our research program is to develop a simulation model for circulating fluidized bed combustors (CFBC). The orientation of this study is therefore made from that point of view. Existing CFBC-models have been presented.

30539 (AAA-REP–91-4) **A dimensional model for char combustion in a circulating fluidized bed.** Kallio, S.; Koskinen, H. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1991. 52p. Order Number DE92562978. Source: OSTI; NTIS.

LIEKKI Research Programme.

A one-dimensional model has been developed for simulation of coal combustion in a circulating fluidized bed. The main goal of the work was to develop a tool examining the interaction between multi-phase flow equations and char combustion models. Other phenomena are thus beyond the scope of the work. The hydrodynamic model treats the gas solids mixture as several interpenetrating fluids: the gas phase and a number of solid phases, some of which consist of inert sand particles and some of burning coal. Char combustion is descibed using a shrinking core model either with or without an ash layer. The simulation program proved to be an efficient tool for making comparisons between different combustion models and for studying effects of different parameter values and material properties. The simulation results were at least qualitatively reasonable.

30540 (CONF-9110369–, pp. 195-210) **Wake architectures in two-dimensional fluidization of spheres: Experiments and phenomenological description.** Fortes, A.F. (Univ. of Brasilia (Brazil)); Joseph, D.D. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

The structure of a shear flow past freely suspended spheres at low Reynolds numbers (based on the diameter of the spheres and the mean fluid velocity) is visualized employing sheets of hydrogen bubbles illuminated by laser light as well as tungsten halogen lamps. The authors use a two-dimensional fluidization apparatus to suspend the spheres in a stream of aqueous solution of glycerol as they acquire different stable wake structures in the shear flow. They describe the wake interactions and vortex shedding from the spheres as the fundamental contributions to the observed stability of the arrangements of the spheres. Stable clusters of two, three and four particles were obtained when $22 < Re < 43$. Out of this range of Re, the particles follow the dynamic scenario of drafting, kissing and tumbling. All the observed arrangements are essentially planar, as the spheres rotate and position themselves with centers in a vertical plane that is not in the center between the two walls of the apparatus. The authors interpret this sideward displacement as a Segre-Silberberg effect.The clusters always have a higher drag than a single particle, which means that the stable architectures occur at fluid velocities always greater than the individual terminal free falling velocities of the spheres.

30541 (CONF-9110369–, pp. 254-286) **Yield stresses in uniformly fluidized suspensions.** Tsinontides, S.C. (Princeton Univ., NJ (United States)); Jackson, R. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Careful measurements of bed expansion and pressure drop during fluidization-defluidization cycles for small particles fluidized by air reveal the existence of marked yield stresses between the point of 'minimum fluidization,' where the bed begins to expand, and the point at which visible bubbling appears. In the case of cracking catalyst there are both tensile and compressive yield limits. Other materials, such as fine sand, can support negligible tensile stress, but there is still a range in which the material has a compressive yield stress. A more detailed picture of the kinematics of bed expansion and recompaction has been revealed by measurements of axial profiles of time-average bulk density, using a gamma ray densitometer with very high spatial resolution. During expansion between the points of minimum fluidization and minimum bubbling there are found to be remarkable quasi-periodic spatial variations in bulk density along the axis of the bed, which could not be accounted for in the absence of yield stresses. A simple theory, which takes into account the yield stresses, is able to predict many of the observed features of both complete and partial fluidization-defluidization cycles. It appears that the well known interval of uniform expansion of fine powders, before the onset of bubbling, may owe its existence to the presence of these yield stresses, rather than reversible 'particle pressures' associated with hydrodynamic effects, as has commonly been postulated.

30542 (DOE/MC/23075–2974, pp. 199-216) **Structure of a near-laminar coal jet flame.** Brewster, B.S. (Brigham Young Univ., Provo, UT (United States)); Smoot, L.D.; Solomon, P.R.; Markham, J.R. Advanced Fuel Research, Inc., East Hartford, CT (United States); Brigham Young Univ., Provo, UT (United States). Jan 1991. DOE Contract AC21-86MC23075. In *Measurement and modeling of advanced coal conversion processes. Annual report, October 1989–September 1990.* 224p. Order Number DE91002056. Source: OSTI; NTIS.

An advanced 2-D model for pulverized-coal combustion has been modified and applied to a laminar coal flame in a transparent wall reactor. Modifications were made to allow for the up-fired flow configuration, laminarization, and gas buoyancy. A laminarization extension to the k-ε turbulence model was incorporated. Particle dispersion is sensitive to laminarization and to the value of turbulent particle Schmidt number. Predicted particle velocity and residence time are sensitive to the inclusion of gas buoyancy, which increases the velocity in the center of the reactor and induces a radial, inward flow. Model predictions have been compared with flame measurements to evaluate the comprehensive model which incorporates an advanced devolatilization submodel. Predicted velocities of burning particles agree well with values determined from particle streaks on video recordings. Good agreement was also obtained between measured and predicted particle burnout. Discrepancies between measured and predicted particle and gas temperatures may be due to neglecting heterogeneous formation of CO_2 and the variation of char reactivity with extent of burnout. Discrepancies between predicted bulk gas temperature and measured CO_2 gas temperature in the ignition zone can also be explained by the fact that the combustion energy first heats the CO_2 which subsequently heats the other gases. Soot decays more slowly than predicted from equilibrium concentrations of condensed carbon.

30543 (DOE/MC/25137-3088) **NUCLA Circulating Atmospheric Fluidized Bed Demonstration Project: 1989 Annual report, [January 1989–December 1989].** Colorado-Ute Electric Association, Inc., Montrose, CO (United States). Feb 1992. 289p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-89MC25137. Order Number DE92001274. Source: OSTI; NTIS; GPO Dep.

The report summarizes unit operating experience and test program progress for 1989 on Colorado-Ute Electric Association's Nucla CFB Demonstration Program. During this period, the objectives of the Nucla Station operating group were to correct problems with refractory durability, resolve primary air fan capacity limitations, complete the high ash and high sulfur coal tests, switch to Salt Creek coal as the operating fuel, and make the unit available for testing without capacity restrictions. Each of these objectives was addressed and accomplished, to varying degrees, except for the completion of the high sulfur coal acceptance tests. (VC)

30544 (DOE/PC/88859-T12) **Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988.** Chen, W.Y.; Lester, T.W.; Babcock, L. Louisiana State Univ., Baton Rouge, LA (United States). [1988]. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-88PC88859. Order Number DE92019207. Source: OSTI; NTIS; GPO Dep.

The study of stoichiometric constraints under equilibrium conditions provides us with the following information related to reburning as a NO reduction technology: (1) The stoichiometry of air to fuel is the most important stoichiometry of air to fuel is the most important stoichiometric variable for reburning; (2) based on equivalent energy production, the comparative reduction efficiencies of the reburning fuels follow the trend: methane > ethane, ammonia > butane > aromatics, coal > CO; (3) the nitrogen in burning coals causes increases in equilibrium NO; (4) equilibrium TFN is not very sensitive in inlet NO concentration; (5) the heat carried by the flue gas in reburning could push the NO reduction toward equilibrium. If so, reburning has a strong correlation with air staging with air preheat. Further experimental verification is required.

30545 (DOE/PC/89661-T4) **Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Public design report.** TransAlta Technologies, Inc., Marion, IL (United States). Sep 1991. 158p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-90PC89661. Order Number. DE92040003. Source: OSTI; NTIS; GPO Dep.

This Public Design Report provides available nonproprietary design information on the Low NO_xSO_x Burner Retrofit of Utility Cyclone Boilers project. In addition to the design aspects, the history of the project, the organization of the project, and the role of the funding parties are discussed. An overview of the Low NO_xSO_x (LNS) Burner, the cyclone boiler and the Southern Illinois Power Cooperative host site is presented. A detailed nonproprietary description of the individual process steps, plant systems, and resulting performance then follows. Narrative process descriptions, simplified process flow diagrams, input/output stream data, operating conditions and requirements are given for each unit. The plant demonstration program and start up provisions, the environmental considerations and control, monitoring and safety factors that are considered are also addressed.

30546 (DOE/PC/89661-T5) **Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Quarterly technical progress report, October–December 1990.** TransAlta Technologies, Inc., Marion, IL (United States). [1990]. 72p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-90PC89661. Order Number DE92040002. Source: OSTI; NTIS; GPO Dep.

Cyclone furnaces operate with high excess air and at high temperature. The heat release during combustion is very high and as a result the boiler volume is much smaller than would be found in a conventional pc-fired system. The Marion Unit 1 boiler, at the level of the cyclone entry, has a small cross-section; about 5-feet in depth and about 20-feet in width. A boiler schematic showing the LNS Burner and relative location of the superheater region and overfire air ports is shown in Figure 1. The LNS Burner's combustion process is fundamentally different from that of the cyclone, and the combustion products are also different. The LNS Burner products enter the boiler as hot, fuel-rich gases. Additional overfire air must be added to complete this combustion step with care taken to avoid the formation of thermal NO_x. If done correctly, $S0_2$ is controlled and significant NO_x reductions are achieved. Because of the small boiler volume, flow modelling was found to be necessary to insure that adequate mixing of LNS Burner combustion products with air can be accomplished to achieve NO_x emissions goals. Design requirements for the air injection system for the Marion boiler were developed using FLUENT, a commercially available computational fluid dynamics (CFD) code. A series of runs were made to obtain a design for final air injection that met the process design goals as closely as possible.

30547 (DOE/PC/89661-T8) **Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Quarterly technical progress report, June–September 1990.** TransAlta Technologies, Inc., Marion, IL (United States). [1990]. 105p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-90PC89661. Order Number DE92019849. Source: OSTI; NTIS; GPO Dep.

The objective of this project is to demonstrate the LNS Burner as retrofitted to the host cyclone boiler for effective low-cost control of NO_x and SO_x emissions while firing a bituminous coal. The LNS Burner employs a simple, innovative combustion process to burn pulverized coal at high temperatures and provides effective, low-cost control of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) emissions. The coal ash contains sulfur and is removed in the form of molten slag and flyash. Cyclone-fired boiler units are typically older units firing high-sulfur bituminous coals at very high temperatures which results in very high NO_x and SO_x emissions. The addition of conventional emission control equipment, such as wet scrubbers, to these older cyclone units in order to meet current and future environmental regulations is generally not economic. Further, the units are generally not compatible with low sulfur coal switching for $S0_2$ control or selective catalytic reduction technologies for NO_x control. Because the LNS Burner operates at the same very high temperatures as a typical cyclone boiler and produces a similar slag product, it may offer a viable retrofit option for cyclone boiler emission control. This was confirmed by the Cyclone Boiler Retrofit Feasibility Study carried out by TransAlta and an Operating Committee formed of cyclone boiler owners in 1989. An existing utility cyclone boiler, was then selected for the evaluation of the cost and performance study. It was concluded that the LNS Burner retrofit would be a cost-effective option for control of cyclone boiler emissions. A full-scale demonstration of the LNS Burner retrofit was selected in October 1988 as part of the DOE's Clean Coal Technology Program Round II.

30548 (DOE/PC/90505-T7) **Mechanism of surface enrichment and adhesion of coal combustion particulates: First quarterly report, February 1987.** Shadman, F.; Peterson, T.W.; Wendt, J.O.L.; Punjak, W.A. Arizona Univ., Tucson, AZ (United States). Dept. of Chemical Engineering. [1987]. 24p. Sponsored by

USDOE, Washington, DC (United States). DOE Contract FG22-86PC90505. Order Number DE92019742. Source: OSTI; NTIS; GPO Dep.

During the first three months of the project, the emphasis has been on the following areas: (1) Design of the apparatus and development of the experimental techniques for the controlled adsorption of alkali on potential additives. (2) Development of techniques for the quantitative and qualitative characterization of alkali distribution in small additive particles using Scanning Auger Spectroscopy. The preliminary experiments of the adsorption of NaCl on bauxite shows a very non-uniform distribution of alkali on the substrate. The chorine appears to undergo some form of chemical interaction with alumina surface. An optimum set of electron beam parameters are found for which the alkali distribution is stable during Auger Spectroscopy and depth profiling by ion milling.

30549 (DOE/PC/90505–T8) **Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987.** Shadman, F.; Peterson, T.W.; Wendt, J.O.L.; Punjak, W.A.; Rizeq, G. Arizona Univ., Tucson, AZ (United States). Dept. of Chemical Engineering. [1987]. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-86PC90505. Order Number DE92019743. Source: OSTI; NTIS; GPO Dep.

Following is an updated list of accomplishments: Design of an experimental set up and development of experimental techniques for study of the adsorption and desorption of alkali on coal ash and potential additive particles. Development of techniques for quantitative and qualitative characterization of alkali distribution in small additive particles using Scanning Auger Spectroscopy. Completion of a set of adsorption experiments for measuring the rate, capacity and adsorption characteristics of alkali adsorption on bauxite, silica, lime and kaolin. Design and set up of a micro-fluidized bed for study of the agglomeration kinetics and characteristics of ash and additive particles. Completion of the first set of experiments on dependence of agglomeration characteristics on the alkali content of typical ash and potential additive particle.

30550 (DOE/PC/91308–3) **Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport: Quarterly technical progress report, March 15, 1992–June 14, 1992.** Queiroz, M.; Webb, B.W. Brigham Young Univ., Provo, UT (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91308. Order Number DE92019858. Source: OSTI; NTIS; GPO Dep.

Progress has been made in the following areas: preparation for reactor refurbishment, instrumentation development, and radiation and particle dispersion modelling. Refurbishment of the Controlled Profile Reactor was initiated this summer. Design work has been completed and construction work began during the last part of this quarter for the local transmissometer probe. This laser-based instrument, combined with the data from the PCSV probe will enable estimate of the local concentration of particulates below 0.5 μm in size. Additionally, it will permit measurement of the temporal statistics of the local particulate number density.

30551 (DOE/PC/91334–T47) **Cooperative research on the combustion characteristics of cofired desulfurized Illinois coal and char with natural gas: Technical report, December 1, 1991–February 29, 1992.** Buckius, R.O.; Wu, Cheng-Kang; Krier, H.; Peters, J.E. Illinois Univ., Urbana, IL (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States); Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States). DOE Contract FG22-91PC91334. Order Number DE92018362. Source: OSTI; NTIS; GPO Dep.

The objective of this project is to determine the contributions of coal type, sulfur type, temperature, and residence time on the coal combustion behavior (especially the effects on ash constituents) during cofiring with natural gas. The Drop Tube Furnace Facility at the University of Illinois at Urbana-Champaign is the chief apparatus to be used in this investigation, with additional diagnostic tools including scanning electron microscopy and other chemical analyses. A complete review of literature related to the project was performed, and a detailed strategy outlined for carrying out the research. It was determined that the DTFF would be modified to extend the operating range to larger sample collection capabilities and higher temperatures (up to 2000K). The modification of the DTFF has been completed. The specific ash characterization experiments are reported in the quarterly TECHNICAL REPORT for the project entitled "Combustion of Illinois coals and chars with Natural Gas". Note that preliminary runs with IBC106 coal with and without methane cofiring in the furnace have produced consistent results with the sulfur analyzed by the LECO Sulfur Determinator. A series of tests will be performed to determine how the overall operating conditions affect sulfur transformation. The furnace will then be tested with the plasma heater to reach the designed gas temperature of 2000K.

30552 (DOE/PC/91334–T49) **Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992.** Singh, S. (SS Energy Environmental International, Inc., Rockford, IL (United States)); Scaroni, A.; Miller, B.; Choudhry, V. Illinois State Geological Survey, Champaign, IL (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States); Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States). DOE Contract FG22-91PC91334. Order Number DE92018249. Source: OSTI; NTIS; GPO Dep.

The overall objective of this proposed research program is to determine the combustion characteristics of the blend derived from mixing a plant coal and recovered and clean coal fines from the pond. During this study, one plant coal and three blend samples will be prepared and utilized. The blend samples will be of a mixture of 90% plant coal + 10% fines, 85% plant coal + 15% fines, 80% plant coal + 20% fines having particle size distribution of 70% passing through -200 mesh size. These samples' combustion behavior will be examined in two different furnaces at Penn State University, i.e., a down-fired furnace and a drop-tube furnace. The down-fired furnace will be used mainly to measure the emissions and ash deposition study, while the drop tube furnace will be used to determine burning profile, combustion efficiency, etc.

30553 (NEI-FI–165) **The corrosion on the surfaces of airpreheaters and electrostatic precipitators in peat-fired boilers.** Vapaavuori, O. (Energiataloudellinen Yhdistys, Helsinki (Finland)); Maskuniitty, H.; Johansson, J. Finnish Energy Economy Association, Helsinki (Finland). 1990. 48p. (In Finnish). Project KTM-126/881/87. Order Number DE92562896. Source: OSTI; NTIS.

This study concerns the corrosion of airpreheaters and electrostatic precipitators in peat-fired boilers. The purpose of the study was to measure corrosion rates of different materials and to evaluate the optimum material as a function of surface temperature. Corrosion rates of steel, alloy steel and cast iron materials were measured in three different peat-fired power plants. Corrosion conditions in those plants can be divided into two categories based on the chloride content in flue gas: - 'high chloride condition' and 'normal condition'. Steels and alloy steels were studied in 'high chloride conditions' and cast irons were studied in 'normal conditions'.

0150 Economic, Industrial, and Business Aspects

30554 (ANL/EAIS/TM–39, pp. 80-97) **Trends in international research, development, and demonstration of clean coal technologies.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

This section focuses on RD and D trends in countries whose CCTs (Clean Coal Technologies) are expected to be competing with those of the United States in the international marketplace. The countries chosen are Canada, Denmark, Finland, Italy, Japan, the Netherlands, the Peoples' Republic of China, South Korea, Sweden, the United Kingdom, and the Federal Republic of Germany. They were chosen because they use coal and have exhibited serious concern about emission of acid-rain precursors and other fossil-fuel-derived pollutants. To the extent possible, public and private information was obtained for this study. The information was assembled along the following lines: Energy use and reserves; Specific governmental incentives for promoting the use, marketing, and research of CCTs; Highlights of the attitudes prevailing in each country that affect its energy technology choices; Public and private RD and D programs related to CCTs; Specific CCTs being pursued in the precombustion, combustion, and postcombustion categories, with emphasis on demonstration, commercialization, and deployment; and Emissions guidelines and regulations. A table lists the specific technologies that are of interest and/or under study in each of the 11 countries selected.

30555 (ANL/EAIS/TM-39, pp. 98-115) **Characterization of selected countries.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

This section characterizes the domestic situation with respect to coal production and use in each of the countries selected as representative of the countries selected as representative of international markets with potential for export of US coal and CCTs (Clean Coal Technologies). The information provided helps to establish a base from which to identify specific marketing opportunities. Most of these opportunities are associated with generating electricity and, to a lesser extent, with generating heat and steam for industrial applications. One of the most important indicators of the potential of exporting US coal and CCTs is a country's medium-term growth in electric utility capacity, that is, the growth from 1990 through 2000. A second important indicator of export potential is the actual and forecasted additions to electric utility coal-fired capacity in the medium term. The wide variation evident in capacity and average annual growth rates, as well as in other coal-use parameters, indicates that the selected countries are likely to represent the range of coal situations in the world. The seven selected countries - Italy, Japan, Morocco, Turkey, Pakistan, the PRC, and Poland - are profiled. The discussions focus on coal demand and use, as well as possible applications for US coals and CCTs.

30556 (ANL/EAIS/TM-39, pp. 116-133) **Comparative analyses of potential markets.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

In assessing potential international markets for US coals and CCTs (Clean Coal Technologies), the first step was to match, in preliminary fashion, the most promising CCTs with the seven countries selected as being representative for the purposes of this marketing study. The second step was to complete economic analyses for the technology/country matches. The purpose of the analyses was to compare the alternative matchings in a quantitative manner so that the potential for economic benefit from implementing the CCTs would be evident. The results of the two steps are presented.

30557 (ANL/EAIS/TM-39, pp. 134-171) **Trade-related issues and barriers.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

This section provides additional data relevant to assessing the potential market in each of the countries selected for this study, by treating several aspects of trade-related information on a country-specific basis. Each country is profiled with respect to (1) pertinent political and economic information; (2) business practices, laws, and regulations that constrain or promote trade; (3) intellectual and industrial property protection related to imported and/or advanced coal technologies; (4) potential marketing channels (such as the establishment of overseas operations, licensing, and joint ventures); and (5) pertinent aspects of financing trade. The information discussed in this section is intended to assist US business entrepreneurs in forming plans of action with respect to potential CCT trade opportunities.

30558 (ANL/EAIS/TM-39, pp. 172-175) **Identification of likely market niches.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

This report has discussed the various types of CCTs (Clean Coal Technologies) being developed and demonstrated in the United States and other countries, reviewed the energy supply and demand conditions and environmental-control requirements in seven representative countries, compared the costs of specific potential CCT applications in these countries, and considered issues related to the international trade of US goods and services. This section of the report serves to integrate this material in order to identify the most likely market niches for US CCTs in the seven countries. Although the focus of this study has been on the application of US CCTs in these countries, many other opportunities exist for US companies in these countries in addition to or in concert with the CCT applications. They include engineering and design services, resource exploration and development, infrastructure expansion and improvement, and the sale of US coal. Although the application of US CCTs would probably reinforce these other opportunities, this aspect has not been investigated in this study, nor has the full extent and range of the linkage with US coal exports. Likely market niches for particular US CCTs are listed in a table. In identifying these market niches, this study assumes that any trade barriers discussed in Sec. 6 would be negotiated until a 'level playing field' would be achieved, in which the US CCTs could compete technically and economically with other options.

30559 (ANL/EAIS/TM-39, pp. 182-187) **Implications for the US Department of Energy's Clean Coal Technology Demonstration Program.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

The analyses presented in this report suggest that, in the near to medium term, there is a significant potential international market for the CCTs (Clean Coal Technology) currently being developed and demonstrated in the US. Specific types of US CCTs have been matched with specific market niches in seven representative countries in previous sections of this report. This section discusses six issues pertinent to the US DOE CCT Demonstration Program from an international perspective and offers some suggestions for DOE's consideration. The suggestions associated with the first issue, the testing of non-US coals, are mutually exclusive; i.e., only one of the recommendations should be implemented. These recommendations are given in priority order. For the other five issues, only one recommendation is given for each issue, and each of these recommendations is not mutually exclusive; i.e., each may be implemented in concert with one or more of the others.

0160 Health and Safety

Refer also to citation(s) 31722

02 PETROLEUM

0202 Reserves, Geology, and Exploration

Refer also to citation(s) 30566, 30574

30560 (DOE/BC/14471-12) **Analysis of reservoir heterogeneities due to shallowing-upward cycles in carbonate rocks of the Pennsylvanian Wahoo Limestone of Northeastern Alaska: Annual report, October 1990–September 1991.** Watts, K. Alaska Univ., Fairbanks, AK (United States). Geophysical Inst. Sep 1992. 68p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89BC14471. Order Number DE92001065. Source: OSTI; NTIS; GPO Dep.

The primary objective of this project is to develop an integrated database to characterize reservoir heterogeneities resulting from numerous small-scale shallowing-upward cycles (parasequences) comprising the carboniferous Pennsylvanian Wahoo Limestone. The Wahoo Limestone is the upper formation of an extensive carbonate platform sequence of the Carboniferous Lisburne Group which is widely exposed in the Brooks Range and is a widespread hydrocarbon reservoir unit in the subsurface of the North Slope of Alaska. A principal goal is to determine lateral and vertical variations in the complex mosaic of carbonate facies comprising the Wahoo Limestone. This report presents the preliminary results of research accomplished by a team of specialists in carbonate petrology, biostratigraphy, and diagenesis during the 1990–1991 fiscal year.It includes a summary of regional geological framework studies, a discussion conodont analyses, an overview of diagenetic studies, a brief description of progress in computerized database development, and appendices containing some of the new data on petrographic analyses, conodont analyses, and locality and sample information. Our correlation scheme, which uses cyclic stratigraphy, biostratigraphy, and cement stratigraphy, will allow interpretation of the depositional history and paleogeographic evolution of the region. We have developed predictive facies models and will make paleogeographic maps to illustrate different stages in the history of the Wahoo carbonate ramp. Our detailed analyses of the Wahoo Limestone will provide a basis for interpreting correlative rocks in the adjacent subsurface of the coastal plain of ANWR, a potential hydrocarbon lease-sale area. In a broader sense, our work will provide an excellent generic example of carbonate shallowing-upward cycles which typify carbonate sediments.

30561 (DOE/BC/14476–11) **Characterization of reservoir rocks and fluids by surface electromagnetic transient methods: Annual report, January 1991–January 1992.** Hoekstra, P. (Blackhawk Geosciences, Inc., Golden, CO (United States)); Blohm, M.W.; Stoyer, C.H.; James, B.A. Blackhawk Geosciences, Inc., Golden, CO (United States). Jan 1992. 58p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14476. Order Number DE92018912. Source: OSTI; NTIS; GPO; GPO Dep.

The objectives of this research are to improve the interpretations of transient electromagnetic (TEM) measurements over two-dimensional subsurface structures. TEM is a surface electromagnetic method employed in fossil energy reservoir exploration and characterization. Electrical measurements find application in (i) assisting in fossil energy exploration mainly in areas where seismic methods yield inadequate data quality, such as volcanic covered terrain, permafrost areas, and the Rocky Mountain overthrust; (ii) mapping contacts between hydrocarbon and brines in shallow producing horizons, and (iii) in monitoring enhanced oil recovery processes which cause zones of lower resistivity. Accomplishments for this past year are presented for the following tasks: (1) site selection and acquisition of high density, 3-component TEM data set over test site; (2) finite element forward modeling; and (3) TEM 2-D subsurface imaging.

30562 (DOE/ER/13636–T2) **[In-situ permeability determination and fracture characterization using elastic waves]: Progress report.** Cheng, A.C.H. Massachusetts Inst. of Tech., Cambridge, MA (United States). Earth Resources Lab. [1992]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER13636. Order Number DE92040159. Source: OSTI; NTIS; GPO Dep.

Fractures or permeable structures in reservoirs are of great importance in the exploration and production of hydrocarbons. Heterogeneous layers in the formation are also of major significance. A very good example of such heterogeneous and permeable structures is the sand-shale sequence found in sedimentary formations. Full waveform acoustic logging offers an effective tool for characterizing these structures. The current technique most commonly used for modeling borehole acoustic wave propagation with heterogeneous formation structures is the finite difference method (Bhashvanija, 1983; Stephen et al., 1985). This technique can handle heterogeneity quite easily. However, the implementation of the method to a permeable porous formation is still a topic of research. Although wavenumber integration technique can be used to calculate wave propagation in homogeneous porous formations (Rosenbaum, 1974; Schmitt et al., 1988), it is very difficult, if not impossible, to apply such a technique to treat problems involving porous layer structures. In this study, the investigators show that if only the low-frequency Stoneley wave is used, the interaction of acoustic waves with borehole permeable structures can be much simplified. The objective of this study is to develop a theoretical model that can be used to calculate borehole Stoneley wave propagation across heterogeneous and permeable structures. As a result, the properties of such structures can be characterized by means of Stoneley wave measurements.

30563 (IFP–39-411) **Reflexion tomography: what information is comprised in the incoming times.** Delprat-Jannaud, F. Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison (France); Paris-11 Univ., 91 - Orsay (France). Nov 1991. 298p. (In French). Order Number DE92566617. Source: OSTI; NTIS (US Sales Only).

Tomography, or incoming time inversion, is used for underground structure determination. The aim of this study is to examine the physical instabilities that hinder its utilization. Sensibility to data small pertubations and to model discretization variation is shown and a method for intrinsic evaluation of information contained in the incoming times, independently of any discretization, is presented together with a formulation for the incoming time inversion problem that leads to a stable solution. A tridimensional example is given.

30564 (NEI-NO–246) **Analysis of three-component seismic data with emphasis on anisotropy.** Mjelde, R. Bergen Univ. (Norway). 1991 159p. Order Number DE92563017. Source: OSTI; NTIS.

Studies of seismic data have traditionally been, and are still mostly concentrated on P waves. This is related to the fact that P waves alone often have been regarded as satisfactory to analyse geological aspects in regional geodynamic studies as well as in prospecting. It has, however, been understood that numerous geological problems can be elucidated in more detail by an integrated use of S and P waves than by P wave study alone. An illustrating example is the better constraints that can be found on possible lithologies if the S wave velocity in the (rock) formation is known in addition to the P wave velocity. An integrated use of S and P waves can further indicate whether a possible reservoir is gas or water saturated. P and S waves detected on the free surface and in boreholes (Vertical Seismic Profiles (VSP)) have often relatively small angles of incidence, which implies that S waves can not be easily analysed if the receiver contains only one geophone sensitive to vertical ground motions. If S waves (and surface waves) are to be studied in detail, a receiver consisting of three orthogonal geophones; one vertical and two horizontal, is generally needed. The research work presented in this thesis was motivated by the presumed potential inherent in three- component data with regard to S waves and surface waves. Three studies of three-component seismic data are discussed in this thesis; two studies from boreholes (VSP) and one using Ocean Bottom Seismographs (OBS). Emphasis has been made to use all three components to extract geophysical and geological information from all observed wave modes, particularly with regard to possible anisotropic effects. 128 refs., 56 figs.

30565 (NEI-NO–248) **Marine geophysical studies in the Northern Atlantic with emphasis on sedimentation, crustal structure and subsidence.** Johansen, B. Oljedirektoratet, Stavanger (Norway); Oslo Univ. (Norway). 1990 211p. Order Number DE92562989. Source: OSTI; NTIS.

The studies compiled in this thesis consist of seven papers, and cover the Norwegian-Greenland Sea, The Barents Sea and the Reykjanes Ridge south of Iceland. The main objective of the first paper was to study variations in subsidence history along the plate boundary at the Reykjanes Ridge, based on the time-transgressive basement lineations observed previously. The principal components of the project described in papers II and III comprise acquisition of multichannel seismic profiles and advanced two-step seismic experiments at the Jan Mayen Ridge. The aim of the study of paper IV was to compile all existing sediment data within the area of oceanic crust in the Norwegian-Greenland Sea to discuss the results in the view of the evolution of the Zenozoic ocean. In the latest two papers recent deep seismic data acquired in the Barents Sea were analyzed. 200 refs., 70 figs., 6 tabs.

0203 Drilling and Production

Refer also to citation(s) 30561

30566 (DOE/BC/14250–12) **Research on improved and enhanced oil recovery in Illinois through reservoir characterization, March 28, 1992–June 28, 1992.** Oltz, D.F. Illinois State Geological Survey, Champaign, IL (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89BC14250. Order Number DE92040383. Source: OSTI; NTIS; GPO Dep.

This project will provide information that can maximize hydrocarbon production, minimize formation damage and stimulate new production in Illinois. Such information includes definition of hydrocarbon resources, characterization of hydrocarbon reservoirs, and the implementation of methods that will improve hydrocarbon extractive technology. Increased understanding of reservoir heterogeneities that affect oil recovery can aid in identifying producible resources. The transfer of technology to industry and the general public is a significant component of the program. The project is designed to examine selected subsurface oil reservoirs in Illinois. Scientists use advanced scientific techniques to gain a better understanding of reservoir components and behavior and address ways of potentially increasing the amount of recoverable oil. Initial production rates for wells in the Illinois Basin commonly decline quite rapidly and as much as 60 percent of the oil in place can be unrecoverable using standard operating procedures. Heterogeneities (geological differences in reservoir make-up) affect a reservoir's capability to release fluids. By-passed mobile and immobile oil remain in the reservoir. To learn how to get more of the oil out of reservoirs, the ISGS is studying the nature of reservoir rock heterogeneities and their control on the distribution and production of bypassed, mobile oil. Accomplishment for this period are summarized for the following tasks: mapping, cross-sections; subsurface depo-systems; outcrop studies; oil and gas development maps; engineering work; SEM/EDX; and clay minerals.

30567 (DOE/BC/14447–15) **Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report.** Seright, R.S.; Martin, F.D. New Mexico Inst. of Mining and Technology, Socorro, NM (United States). New Mexico Petroleum Recovery Research Center. Sep 1992. 165p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89BC14447. Order Number DE92001061. Source: OSTI; NTIS; GPO Dep.

The objectives of this project were to identify the mechanisms by which gel treatments divert fluids in reservoirs and to establish where and how gel treatments are best applied. Several different types of gelants were examined, including polymer-based gelants, a monomer-based gelant, and a colloidal-silica gelant. This research was directed at gel applications in water injection wells, in production wells, and in high-pressure gas floods. The work examined how the flow properties of gels and gelling agents are influenced by permeability, lithology, and wettability. Other goals included determining the proper placement of gelants, the stability of in-place gels, and the types of gels required for the various oil recovery processes and for different scales of reservoir heterogeneity. During this three-year project, a number of theoretical analyses were performed to determine where gel treatments are expected to work best and where they are not expected to be effective. The most important, predictions from these analyses are presented. Undoubtedly, some of these predictions will be controversial. However, they do provide a starting point in establishing guidelines for the selection of field candidates for gel treatments. A logical next step is to seek field data that either confirm or contradict these predictions. The experimental work focused on four types of gels: (1) resorcinol-formaldehyde, (2) colloidal silica, (3) Cr^{3+}(chloride)-xanthan, and (4) Cr^{3+}(acetate)-polyacrylamide. All experiments were performed at 41°C.

30568 (DOE/BC/14600–32) **Visualization of foam/oil in a new, high resolution, sandstone replica micromodel.** Hornbrook, J.W.; Pettit, P.; Castanier, L.M. Stanford Univ., CA (United States). Petroleum Research Inst. Aug 1992. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90BC14600. (SUPRI-TR–86). Order Number DE92001067. Source: OSTI; NTIS; GPO Dep.

A new micromodel construction procedure has been developed as a tool to better understand and model pore level events in porous media. The construction procedure allows for the almost exact two-dimensional replication of any porous medium of interest. For the case presented here a berea sandstone was chosen. Starting with a thin section of the porous medium of interest, a two-dimensional replica of the flow path is etched into a silicon wafer to a prescribed depth. Bonding the etched pattern to a flat glass plate isolates the flow path and allows the pore level flow events to be studied. The high resolution micromodels constructed with the new procedure were used to study the effects of oil on the displacement characteristics of foam in a porous medium of intermediate wettability. A crude oil was injected into the micromodel, partially filling it. The oil was then produced under two different displacement schemes. First, a slug of surfactant was used. Second, foam generated in situ, far from the oil bank, was used to displace the oil. Qualitative observations indicate significant differences at the interface between the oil and the displacing phase. When slug surfactant injection is used, the oil appears to wet the surface. The oil displacement process is efficient due to a large fractional production of oil from the large pores before the surfactant breaks through. When in-situ foam is the displacing phase, the foam is observed to break near the oil interface. The liquid phase in the foam becomes the wetting phase. It is observed to reside in the small pores and to coat most of the grain surfaces. Displacement of oil under this injection scheme is inefficient due to transfer of the surfactant along grain edges and subsequent early breakthrough of the surfactant.

30569 (DOE/BC/14600–33) **A three-dimensional laboratory steam injection model allowing in situ saturation measurements.** Demiral, B.M.R.; Pettit, P.A.; Castanier, L.M.; Brigham, W.E. Stanford Univ., CA (United States). Petroleum Research Inst. Aug 1992. 79p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90BC14600. (SUPRI-TR–83). Order Number DE92001059. Source: OSTI; NTIS; GPO Dep.

The CT imaging technique together with temperature and pressure measurements were used to follow the steam propagation during steam and steam foam injection experiments in a three dimensional laboratory steam injection model. The advantages and disadvantages of different geometries were examined to find out which could best represent radial and gravity override flows and also fit the dimensions of the scanning field of the CT scanner. During experiments, steam was injected continuously at a constant rate into the water saturated model and CT scans were taken at six different cross sections of the model. Pressure and temperature data were collected with time at three different levels in the model. During steam injection experiments, the saturations obtained by CT matched well with the temperature data. That is, the steam override as observed by temperature data was also clearly seen on the CT pictures. During the runs where foam was present, the saturation distributions obtained from CT pictures showed a piston like displacement. However, the temperature distributions were different depending on the type of steam foam process used. The results clearly show that the pressure/temperature data alone are not sufficient to study steam foam in the presence of non-condensible gas.

30570 (DOE/BC/14660–T1) **Oil recovery improvement through profile modification by thermal precipitation.** Reis, J. Texas Univ., Austin, TX (United States). [1991]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14660. Order Number DE92019817. Source: OSTI; NTIS; GPO Dep.

The objective of this study is to develop the method of temperature dependent precipitation as a means to modify injection profiles in petroleum reservoirs. A saturated solution is injected into a reservoir at high temperature and allowed to cool. If the chemical has a decreasing solubility with decreasing temperature, the chemical will precipitate in the reservoir. This will plug that part of the reservoir and divert subsequently injected fluids into other regions of the reservoir. The primary objective for this quarter was to complete the design of the experimental apparatus, order the necessary equipment, conduct a survey of candidate chemicals, and continue the development of models for the thermal precipitation process.

30571 (DOE/BC–92001062) **A pore-level scenario for the development of mixed-wettability in oil reservoirs.** Kovscek, A.R.; Wong, H.; Radke, C.J. Lawrence Berkeley Lab., CA (United States). Sep 1992. 52p. Sponsored by USDOE, Washington, DC

(United States). Order Number DE92001062. Source: OSTI; NTIS; GPO Dep.

Understanding the role of thin films in porous media is vital if wettability is to be elucidated at the pore level. The type and thickness of films coating pore walls determines reservoir wettability and whether or not reservoir rock can be altered from its initial state of wettability. Pore shape, especially pore wall curvature, is an important factor in determining wetting-film thicknesses. Yet, pore shape and the physics of thin wetting films are generally neglected in models of flow in porous rocks. This paper incorporates thin-film forces into a collection of star-shaped capillary tubes model to describe the geological development of mixed-wettability in reservoir rock. Here, mixed-wettability refers to continuous and distinct oil and water-wetting surfaces coexisting in the porous medium. The proposed model emphasizes the remarkable role of thin films. New pore-level fluid configurations arise that are quite unexpected. For example, efficient water displacement of oil (i.e, low residual oil saturation) characteristic of mixed-wettability porous media is ascribed to interconnected oil lenses or rivulets which bridge the walls adjacent to a pore corner. Predicted residual oil saturations are approximately 35 % less in mixed-wet rock compared to completely water-wet rock. Calculated capillary pressure curves mimic those of mixed-wet porous media in the primary drainage of water, imbibition of water, and secondary drainage modes. Amott-Harvey indices range from −0.18 to 0.36 also in good agreement with experimental values. (Morrow et al, 1986; Judhunandan and Morrow, 1991).

30572 (DOE/BC--92001066) **The validation of horizontal well models using a physical model of heat flow in an anisotropic conductor.** Sabeh, M. (Pittsburgh Univ., PA (United States)); Enick, R.M.; Ammer, J.R. USDOE Morgantown Energy Technology Center, WV (United States). Aug 1992. 25p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92001066. Source: OSTI; NTIS; GPO Dep.

Two recently proposed models of fluid flow in anisotropic media yield different expressions for horizontal well productivity due to their representation of the wellbore. The model developed by Babu and Odeh used a point source/sink for the wellbore, while Peaceman's model implemented an isobaric boundary along the surface of the wellbore. Babu and Odeh's model predicted elliptical isobars, even in the immediate vicinity of the wellbore. Peaceman's model predicted a rapid transition from circular to elliptical isobars as the distance from the wellbore increased. Both models were mathematically correct and seemed plausible. Therefore, the more appropriate model to use in reservoir simulation was determined experimentally. The temperature-induced flow of heat from an anisotropic conductor into a circular heat sink is analogous to the pressure-induced flow of fluids from an anisotropic porous medium into a circular wellbore since the governing differential equations for both processes are identical in form. Heat transfer experiments were, therefore, used to model this fluid flow problem. The results clearly indicated that a transition from circular to elliptical isopotential occurred, in agreement with Peaceman's model. It is, therefore, more appropriate to model a wellbore as an isopotential when studying near-wellbore problems, such as the calculation of well productivity. The calculation of well productivity, however, involves near-wellbore effects. The point source does not bound the porous medium which is governed by the differential equation. Since it is separated from the medium by a distance equivalent to the radius of the well, it should not be used as a boundary condition. The isobaric surface of the wellbore does bound the medium, and, therefore, provides the better representation of the high conductivity wellbore.

30573 (IFP--39-530) **Numerical dispersion reduction by correction of mass flows. Application to the problem of hydrocarbon recovery by chemical processes.** Song, J. Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison (France); Paris-6 Univ., 75 (France). Feb 1992. 195p. (In French). Order Number DE92566618. Source: OSTI; NTIS (US Sales Only).

First order numerical schemes are shown to be too unprecise to resolve multiphase flows in porous media; second order schemes appear inefficient. A new approach is proposed, based on improving mass local balance precision (initially represented by a first order explicit scheme): mass flows entering and leaving a discrete block, are rectified through a weighted mean flux method. Dispersion is thus reduced and numerical accumulation is prevented. The method is applied to hydrocarbon recovery in porous media.

30574 (NIPER--617) **[National Institute for Petroleum and Energy Research] monthly progress report for June 1992.** National Inst. for Petroleum and Energy Research, Bartlesville, OK (United States). Aug 1992. 64p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-83FE60149. Order Number DE92019703. Source: OSTI; NTIS; GPO Dep.

Accomplishments for this period are described briefly under tasks for: Energy Production Research; Fuels Research; and Supplemental Government Program. Energy Production Research includes: reservoir assessment and characterization; TORIS research support; development of improved microbial flooding methods; surfactant flooding methods; development of improved alkaline flooding methods; mobility control and sweep improvement in chemical flooding; gas flood performance prediction improvement; mobility control, profile modification, and sweep improvement in gas flooding; three-phase relative permeability research; thermal processes for light oil recovery; thermal processes for heavy oil recovery; and imaging techniques applied to the study of fluid in porous media. Fuels research includes; development of analytical methodology for analysis of heavy crudes; and thermochemistry and thermophysical properties of organic nitrogen- and diheteroatom-containing compounds. Supplemental Government Program includes: microbial-enhanced waterflooding field project; feasibility study of heavy oil recovery in the midcontinent region--Oklahoma, Kansas, and Missouri; surfactant-enhanced alkaline flooding field project; development of methods for mapping distribution of clays in petroleum reservoirs; summary of geological and production characteristics of class 1, unstructured, deltaic reservoirs; third international reservoir characterization technical conference; process-engineering property measurements on heavy petroleum components; development and application of petroleum production technologies; upgrade BPO crude oil data base; simulation analysis of steam-foam projects; and analysis of the U. S. oil resource base and estimate of future recoverable oil.

0207 Economic, Industrial, and Business Aspects

Refer also to citation(s) 31072, 31073

30575 (CMI-R--90/A30005) **Petroleum taxation and the incentives for exploration and development.** Stensland, G.; Sunnevaag, K. Christian Michelsens Inst. for Vitenskap og Aandsfrihet, Bergen (Norway). Apr 1990. 111p. Order Number DE92562991. Source: OSTI; NTIS; INIS.

The authors find serious problems in the present tax system when evaluating fields with uncertain income. The tax system is not neutral. This result will depend on the profitability of the project in question, the level of the company's activity and the stochastic representation of price. To circumvent these problems the authors investigate various changes in the tax system. A simple rule where 10% of the annual profit can be deducted from the before tax profit and allocated to a fund, is the best of the alternatives which have been investigated. This fund is reduced if profits are negative. When distributed to the owners the company pays 80.8% tax on the money. Compared to the tax on dividends of 53.8% (no state tax is payed on dividends) this makes the allocation rule unprofitable for companies which do not expect to run into a deficit when the price is low. For the same reason the carry-back rule looks unprofitable in a deterministic model, when evaluating the expected present value of cash-flow to owners, and so there should be few arguments from the government point of view, using deterministic models, not to implement it. 43 refs., 60 figs., 44 tabs.

30576 (DOE/EIA--0109(92/08)) **Petroleum supply monthly, August 1992.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. Aug 1992. 164p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92040700. Source: OSTI; NTIS; GPO; GPO Dep.

Data presented in the PSM describe the supply and disposition of petroleum products in the United States and major US geographic regions. The data series describe production, imports and exports, inter-Petroleum Administration for Defense (PAD) District movements, and inventories by the primary suppliers of petroleum products in the United States (50 States and the District of Columbia). The reporting universe includes those petroleum sectors in Primary Supply. Included are: petroleum refiners, motor gasoline blenders, operators of natural gas processing plants and fractionators, inter-PAD transporters, importers, and major inventory holders of petroleum products and crude oil. When aggregated, the data reported by these sectors approximately represent the consumption of petroleum products in the United States.

30577 (DOE/EIA-0380(92/08)) **Petroleum marketing monthly, August 1992.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. 10 Aug 1992. 183p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019675. Source: OSTI; NTIS; GPO; GPO Dep.

The Petroleum Marketing Monthly is designed to give information and statistical data about a variety of crude oils and refined petroleum products. The publication provides statistics on crude oil costs and refined petroleum products sales for use by industry, government, private sector analysts, educational institutions, and consumers. Data on crude oil include the domestic first purchase price, the f.o. b. and landed cost of imported crude oil, and the refiners' acquisition cost of crude oil. Sales data for motor gasoline, distillates, residuals, aviation fuels, kerosene, and propane are presented.

0208 Waste Management

30578 (ANL/CP-75350) **Waste minimization in the oil and gas industries.** Smith, K.P. Argonne National Lab., IL (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209160-5: International symposium on energy, environment and information management, Argonne, IL (United States), 15-18 Sep 1992). Order Number DE92019596. Source: OSTI; NTIS; INIS; GPO Dep.

Recent legislative actions place an emphasis on waste minimization as opposed to traditional end-of-pipe waste management. This new philosophy, coupled with increasing waste disposal costs and associated liabilities, sets the stage for investigating waste minimization opportunities in all industries wastes generated by oil and gas exploration and production (E&P) and refuting activities are regulated as non-hazardous under the Resource Conservation and Recovery Act (RCRA). Potential reclassification of these wastes as hazardous would make minimization of these waste streams even more desirable. Oil and gas E&P activities generate a wide variety of wastes, although the bulk of the wastes (98%) consists of a single waste stream: produced water. Opportunities to minimize E&P wastes through point source reduction activities are limited by the extractive nature of the industry. Significant waste minimization is possible, however, through recycling. Recycling activities include underground injection of produced water, use of closed-loop drilling systems, reuse of produced water and drilling fluids in other oilfield activities, use of solid debris as construction fill, use of oily wastes as substitutes for road mix and asphalt, landspreading of produced sand for soil enhancement, and roadspreading of suitable aqueous wastes for dust suppression or deicing. Like the E&P wastes, wastes generated by oil and gas treatment and refining activities cannot be reduced substantially at the point source but can be reduced through recycling. For the most part, extensive recycling and reprocessing of many waste streams already occurs at most petroleum refineries. A variety of innovative waste treatment activities have been developed to minimize the toxicity or volume of oily wastes generated by both E&P and refining activities. These treatments include bioremediation, oxidation, biooxidation, incineration, and separation. Application of these treatment processes is still limited.

0209 Environmental Aspects

Refer also to citation(s) 30753, 31187

30579 (EGG-10617-2118) **Endangered Species Program Naval Petroleum Reserves in California: Annual report FY90.** EG and G, Inc., Goleta, CA (United States). Santa Barbara Operations. Feb 1992. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-88NV10617. Order Number DE92011447. Source: OSTI; NTIS; INIS; GPO Dep.

The Naval Petroleum Reserves in California (NPRC) are operated by the US Department of Energy (DOE). Construction and development activities, which are conducted by DOE at Naval Petroleum Reserve #1 (NPR-1) to comply with the Naval Petroleum Reserves Production Act of 1976 (Public Law 94-258), potentially threaten the continued existence of four federally-listed endangered species: the San Joaquin kit fox, (Vulpes macrotis mutica), blunt-nosed leopard lizard (Gambelia silus), giant kangaroo rat (Dipodomys ingens), and Tipton kangaroo rat (Dipodomys nitratoides nitratoides). All four are protected under the Endangered Species Act of 1973. The major objective of the Endangered Species Program on NPR-1 and NPR-2 is to provide DOE with the scientific expertise and continuity of programs necessary for continued compliance with the Endangered Species Act. The specific objective of this report is to summarize progress and results of the Endangered Species Program made during Fiscal Year 1990 (FY90).

30580 (NEI-NO-249) **State of the Arctic Environment: Report on oil pollution.** Statens Forurensningstilsyn, Oslo (Norway). 1990 73p. Order Number DE92562992. Source: OSTI; NTIS; INIS.

The Arctic environment, covering about 21 million km^2, is in this connection regarded as the area north of the Arctic Circle. General biological and physical features of the terrestrial and freshwater environments of the Arctic are briefly described, but most effort is put into a description of the marine part which constitutes about two-thirds of the total Arctic environment. General oceanography and morphological characteristics are included; e.g. that the continental shelf surrounding the Arctic deep water basins covers approximately 36% of the surface areas of Arctic waters, but contains only 2% of the total water masses. Blowout accident may release thousands of tons of oil per day and last for months. They occur statistically very seldom, but the magnitude underlines the necessity of an efficient oil spill contingency as well as sound safety and quality assurance procedures. Contingency plans should be coordinated and regularly evaluated through simulated and practical tests of performance. Arctic conditions demand alternative measures compared to those otherwise used for oil spill prevention and clean-up. New concepts or optimization of existing mechanical equipment is necessary. Chemical and thermal methods should be evaluated for efficiency and possible environmental effects. Both due to regular discharges of oil contaminated drilled cuttings and the possibility of a blowout or other spills, drilling operations in biological sensitive areas may be regulated to take place only during the less sensitive parts of the year. 122 refs., 8 figs., 8 tabs.

30581 (NINA-R-017) **Research program on the biological effects of oil pollution: Final report.** Barrett, R.T. (ed.). Norsk Undervannsteknologisk Senter, Ytre Laksevaag (Norway). Dec 1991. 85p. (In Norwegian). Order Number DE92562990. Source: OSTI; NTIS; INIS.

A national research program on the biological effects of oil pollution (FOBO) was initiated by the Norwegian Ministry of Environment in October 1983 in the light of the increasing oil exploration and production activity in the North Sea and northern Norwegian waters. Ambitions were high and five main fields of research were suggested: Seabirds, fish (incl. salmon), marine mammals, the littoral zone and plankton. However, due to the lack of interest on the part of other potential financers, e.g. the Ministry of Fisheries and the oil companies, to participate, the four-year programme had to be limited to the following three topics: Seabirds around bruding colonies and at sea; Higher plants along the shoreline; The littoral zone. The program ran from the autumn of 1985 to the end of 1989 and this report summarizes the main results and conclusions of each project. 95 refs., 52 figs., 9 tabs.

30582 (SNV–3968) **Impact of fuels on diesel exhaust emissions: A chemical and biological characterization.** Westerholm, R. (Stockholm Univ. (SE). Dept. of Analytical Chemistry); Egebaeck, K.E. Swedish Environmental Protection Agency, Solna (Sweden). Sep 1991. 158p. Order Number DE92563058. Source: OSTI; NTIS; INIS.

This report presents an investigation of the emissions from eight diesel fuels with different sulphur and aromatic content. A bus and a truck were used in the investigation. Chemical analysis and biological testing have been performed. The aim of this project was to find a 'good' diesel fuel which can be used in urban areas. Seven of the fuels were meant to be such fuels. It has been confirmed in this study that there exists a quantifiable relationship between the variables of the diesel fuel blends and the variables of the chemical emissions and their biological effects. 119 figs., 12 tabs., approx. 100 refs.

0210 Legislation and Regulations

Refer also to citation(s) 30575

0220 Transport, Handling, and Storage

30583 (DOE/IG–92040423) **US Department of Energy Naval Petroleum Reserves combined financial statement.** USDOE Office of Inspector General, Washington, DC (United States). Office of Assistant Inspector General for Audits; Peat Marwick, Salt Lake City, UT (United States). 30 Sep 1991. 34p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

The attached report presents the results of the independent certified public accountants' audit of the Department of Energy's Naval Petroleum Reserves (NPR) financial statements as of September 30, 1991. In their opinion, the NPR statements are fairly presented in all material respects in accordance with generally accepted accounting principles except as described in their report. Their reports on the NPR internal control structure and on its compliance with laws and regulations, and management letter on addressing needed improvements are also provided.

30584 (ER-BC–92-03) **Procurement activities at the Strategic Petroleum Reserve.** USDOE Office of Inspector General, Oak Ridge, TN (United States). Eastern Regional Audit Office. 6 Aug 1992. 17p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

The Strategic Petroleum Reserve (SPR) is responsible for purchasing and storing crude oil to mitigate the potential adverse impact of any future disruptions in crude oil imports. Boeing Petroleum Services, Inc. (BPS) operates the SPR under a US Department of Energy (DOE) management and operating contract. The audit objective was to determine whether BPS solicited, awarded, and administered subcontracts in accordance with applicable Federal, DOE, and BPS procurement regulations. Our audit disclosed that BPS had not fully complied with prescribed procurement regulations in that it had not:(l) obtained competitive quotations or distributed subcontract awards equitably among qualified suppliers; (2) prevented subcontract awards to vendors debarred from Federal contracts; (3) prepared or obtained required documentation; and (4) ensured the prompt close-out of subcontracts. This condition existed because supervisors did not ensure that buyers were complying with prescribed procurement procedures. Also, BPS had not made effective use of a computer-based information system to administer subcontracts. As a result of these conditions, BPS could not provide DOE with reasonable assurance that purchases were made economically, that the Government's interests were adequately protected, and that unnecessary costs were not incurred. Our report identifies various corrective actions for strengthening internal controls and improving the procurement function. SPRPMO's management generally concurred with the finding and associated recommendations. However, they deferred comment on the recommended elimination of a duplicate procurement information system until they had completed a study of the feasibility and cost of such an action.

0230 Properties and Composition

Refer also to citation(s) 30574, 30603

0250 Combustion

Refer also to citation(s) 32522

03 NATURAL GAS

30585 (NUTEK-ALTD–92-2) **Alternative automotive fuels in USA. Cost-, supply- and environmental aspects.** Modahl-Borg, C. (Sveriges Tekniska Attacheer, Stockholm (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1991. 64p. (In Swedish). Project NUTEK-266-131. Order Number DE92563025. Source: OSTI; NTIS.

Alternative automotive fuels will be successively introduced and during the next two decades the use of cars utilizing these kind of fuels will increase rapidly. This is especially relevant for those vehicles that by law have to be fuelled with alternatives. The first vehicles will be using alcohol fuels, primarily because the alcohols can be mixed with gasoline. Natural gas will be more advantageous in heavier vehicles than in ordinary cars. The probable scenario after the year 2010 is that more and more cars will utilize electric power, hydrogen gas or fuel cells. (20 refs., 43 figs.).

0302 Reserves, Geology, and Exploration

Refer also to citation(s) 30588, 30591

30586 (SAND–89-2612/Pt.A) **Multiwell Experiment final report: 4, The fluvial interval of the Mesaverde Formation.** Sandia National Labs., Albuquerque, NM (United States); CER Corp., Las Vegas, NV (United States). Jan 1990. 458p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE90007948. Source: OSTI; NTIS; GPO; GPO Dep.

The Department of Energy's Multiwell Experiment (MWX) is a field laboratory in the Piceance Basin of Colorado which has two overall objectives: to characterize the low permeability gas reservoirs in the Mesaverde Formation and to develop technology for their production. Different depositional environments have created distinctly different reservoirs in the Mesaverde, and MWX has addressed each of these in turn. This report presents a comprehensive summary of results from the fluvial interval which lies between 4400 ft and 600 ft at the MWX site. The reservoirs consist of heterogeneous, amalgamated point-bar sequences which form broad meanderbelts which create irregular, but roughly tabular, reservoirs with widths of 1000–2500 ft. Separate sections of this report are background and summary; site descriptions and operations; geology; log analysis; core analysis; in situ stress; well testing, stimulation, fracture diagnostics, and reservoir evaluation in two separate sandstones; stress, fracture diagnostic, and stimulation experiments in an additional sandstone; supporting laboratory studies; and a bibliography. Additional detailed data, results, analyses, and data file references are presented as appendices which are included on microfiche. The results show that stimulation of fluvial reservoirs can be successful if proper care is taken to minimize damage to the natural fracture system. Both an accelerated leakoff phenomenon and the ability to alter the in situ stress were quantified. Overall, the fluvial interval offers the highest production potential of the three nonmarine intervals studied. 141 refs., 92 figs., 33 tabs.

30587 (SAND–92-1648C) **Natural fracture systems studies.** Lorenz, J.C.; Warpinski, N.R. Sandia National Labs., Albuquerque, NM (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920584–26: US Department of Energy contractor review meeting on natural gas research and development, Morgantown, WV (United States), 5-6 May 1992). Order Number DE92019426. Source: OSTI; NTIS; GPO Dep.

The objectives of this program are (1) to develop a basinal-analysis methodology for natural fracture exploration and exploitation, and (2) to determine the important characteristics of natural fracture systems for use in completion, stimulation, and production operations. Natural-fracture basinal analysis begins with studies of fractures in outcrop, core and logs in order to determine the type of fracturing and the relationship of the fractures to the lithologic environment. Of particular interest are the regional fracture systems that are pervasive in western US tight sand basins. A Methodology for applying this analysis is being developed, with the goal of providing a structure for rationally characterizing natural fracture systems basin-wide. Such basin-wide characterizations can then be expanded and supplemented locally, at sites where production may be favorable. Initial application of this analysis is to the Piceance basin where there is a wealth of data from the Multi-well Experiment (MWX), DOE cooperative wells, and other basin studies conducted by Sandia, CER Corporation, and the USGS (Lorenz and Finley, 1989, Lorenz et al., 1989, and Spencer and Keighin, 1984). Such a basinal approach has been capable of explaining the fracture characteristics found throughout the southern part of the Piceance basin and along the Grand Hogback.

0303 Drilling, Production, and Processing

Refer also to citation(s) 30587

30588 (DOE/MC/26026–C0042) **Multi-strata exploration and production study, October 1,1989–September 24, 1992.** Overbey, W.K. (BDM Engineering Services Co., Morgantown, WV (United States)); Reeves, T.K.; Locke, C.D.; Salamy, S.P.; Johnson, H.R.; Hawkins, H.R. College of West Virginia, Beckley, WV (United States); BDM Engineering Services Co., Morgantown, WV (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-89MC26026. (CONF-920584–25: US Department of Energy contractor review meeting on natural gas research and development, Morgantown, WV (United States), 5-6 May 1992). Order Number DE92019175. Source: OSTI; NTIS; GPO Dep.

The Multi-Strata project is designed to co-develop both natural gas and coal-bed methane produced through a single well bore. Sites were selected based on the total gas resources available for development combined with a sound knowledge of the reservoir parameters that contribute to the accumulation and production of natural gas in the study area of Raleigh County, West Virginia. The project was planned and is being conducted in two phases. Phase I of the project, initiated in October 1989, consisted of compiling and analyzing relevant geological and gas production information in Raleigh County, West Virginia. The Eccles 7-$\frac{1}{2}$ Minute . The Phase I analysis identified, by May 1990, five drilling locations with a high potential for economic gas production. Phase II activities included the drilling, coring, logging, testing, and completion of three wells. It is clear from the tests conducted to date, that the three wells will deliver significant quantities of natural gas from the conventional formations, augmented by high-quality methane from the coal intervals. Gas deliverability will be determined in the upcoming production test into a commercial pipeline. Economic analyses of the project will be undertaken when sufficient production data have been obtained.

30589 (DOE/MC/26343–3084) **Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report.** Koziar, G. (Columbia Gas System Service Corp., Columbus, OH (United States)); Ahmad, M.M.; Friend, L.L.; Friend, M.L.; Rothman, E.M.; Stollar, R.L. Columbia Gas System Service Corp., Columbus, OH (United States); Columbia Natural Resources, Inc., Charleston, WV (United States). May 1991. 230p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-89MC26343. Order Number DE92001270. Source: OSTI; NTIS; GPO Dep.

Columbia Gas and the United States Department of Energy (DOE) have successfully completed field work on a horizontally drilled Devonian shale well located in Martin County, Kentucky. The objective of this cofunded project is to assess the effectiveness and economic feasibility of applying horizontal drilling and hydraulically fracturing stimulation techniques to enhance the extraction of natural gas from the Devonian shale. The well is comprised of three segments: a conventional vertical section, an angle build section and a horizontal section. The well reached a measured depth (MD) of 6263 feet, 3810 feet true vertical depth (TVD), with a horizontal displacement of 2812 feet achieved in the desired direction of N10°W. Both air and foam were used as drilling fluids. The vertical, lateral and tangent sections were drilled using conventional rotary drilling methods. Downhole motors were used to build angle. A total combined final open flow of 3.1 MMcfd was measured from all zones. Total well expenditures are approximately $1,460,000. Of this amount, $700,000 is directly related to the research and learning curve experience aspects. It is projected that the same horizontal well could be drilled with existing technology for $700,000. If advanced can be made in MWD systems for air drilling environments, wells of this type could be drilled routinely for $500,000. It appears that application of horizontal drilling will result in at least acceleration of gas production and possibly the addition of recoverable reserves from the Devonian shale. Production data, necessary to validate this statement, are also required to determine the economics. As we gain experience and technology advances, cost reductions will occur; this will result in economic improvement.

30590 (DOE/METC/C–92/7023) **Unconventional gas systems analysis.** Zammerilli, A.M.; Duda, J.R.; Layne, A.W. USDOE Morgantown Energy Technology Center, WV (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). (CONF-920584–28: US Department of Energy contractor review meeting on natural gas research and development, Morgantown, WV (United States), 5-6 May 1992). Order Number DE92019681. Source: OSTI; NTIS; GPO Dep.

Gas systems analysis at the Morgantown Energy Technology Center (METC) crosscuts all sectors of the natural gas industry from resource to utilization. The board-based analysis identifies market needs that are required to maintain and expand the competitive position of natural gas in the overall energy supply by providing "market pull" options. METC systems analyses continually explore the impact of cost-lowering alternatives, which lead to the development of production and economic strategies to improve and promote the utilization of natural gas. Results of systems analyses identify socioeconomic, environmental, and regulatory barrier issues, providing a strategic base for guiding and improving future gas research, development, and demonstration initiative. Some recent analyses have focused on METC's directional well projects, targeting unconventional formations throughout the United States. Specifically, cost supply relationships and risk assessments are being developed for low-permeability gas formations underlying the Maverick, Greater Green River, Piceance, and Appalachian Basins.

30591 (DOE/METC/C–92/7024) **Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas.** Mroz, T.H. (EG and G Washington Analytical Services Center, Inc., Morgantown, WV (United States)); Schuller, W.A. USDOE Morgantown Energy Technology Center, WV (United States). [1992]. 20p. Sponsored by USDOE, Washington, DC (United States). (CONF-920584–27: US Department of Energy contractor review meeting on natural gas research and development, Morgantown, WV (United States), 5-6 May 1992). Order Number DE92019682. Source: OSTI; NTIS; GPO Dep.

To increase the knowledge of horizontal drilling in lower permeability reservoirs, US DOE/METC is presently involved in the evaluation of horizontal well sites in Mahoning Country, Ohio; Yuma Country, Colorado; and Maverick County, Texas. The sites differ in reservoir lithology and tectonic settings: Medina Sandstone, Niobrara Chalk, and Glen Rose carbonates, respectively. A suite of data for each site was compiled to include well logs, production data, pressure data, and seismic sections. These data were required as input parameters to two-and three-dimensional geologic models used for characterizing each reservoir. Results obtained from the models will be used to locate and design the wellbore geometry at each site. The primary objective of this study is to optimize production by designing and orienting each wellbore to penetrate the maximum length of the main stratigraphic and naturally fractured pay within each target formation.

30592 (NEI-FI–167) **Research needs on the natural gas field in Finland.** Rutanen, V. (University of Technology, Espoo

(Finland). Institute of Energy Technology). Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1992. 79p. (In Finnish). Project KTM-139/881/90. Order Number DE92562898. Source: OSTI; NTIS; INIS.

This report deals with the research needs on natural gas sector in Finland during the next 5-10 years. On that ground it has also been drafted a proposal for organization of the research and on which fields the research should be directed. The basis and criterium in this study has been on the other hand, the improvement of the possibilities in international trade of finnish companies and on the other hand the improvement of the efficiency and the reduction of the environmental impacts of energy use and production in Finland. As a result of the study it is proposed that a research entireness, which will direct extensively towards the gaseous fuels (gasification of coal and biomass, natural gas, LPG, hydrogen), will be formed. The key topics of the research would be: Production of the gases (gasification), high-efficient power and heat generation with gaseous fuels, improvement of efficiency and reduction of environmental impacts of energy use in industry with direct use of gaseous fuels and gaseous fuels in vehicles.

0306 Economic, Industrial, and Business Aspects

30593 (CONF-920289–) **Record of proceedings: Conference on state regulation and the market potential for natural gas: Challenges and opportunities.** USDOE, Washington, DC (United States); National Association of Regulatory Utility Commissioners, Washington, DC (United States). [1992]. 512p. Sponsored by USDOE, Washington, DC (United States); National Association of Regulatory Utility Commissioners, Washington, DC (United States). From Conference on state regulation and the market potential for natural gas: challenges and opportunities; Phoenix, AZ (United States); 3-5 Feb 1992. Order Number DE92016374. Source: OSTI; NTIS; INIS; GPO Dep.

This conference was convened by the US Department of Energy and the National Association of Regulatory Utility Commissioners to provide a forum for state and federal policymakers, sate and federal regulators, and all segments of the natural gas industry to address issues of significance to the current and future use of natural gas, with particular emphasis on sate regulation. The conference brought together a cross-section of interested parties to begin the process of identifying the barriers to natural gas achieving its market potential and developing better communication between Federal officials, State officials and different segments of the natural gas and electric industries.

30594 (DOE/EIA–0130(92/07)) **Natural gas monthly, July 1992.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. 29 Jul 1992. 148p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92018929. Source: OSTI; NTIS; GPO Dep.

The Natural Gas Monthly (NGM) highlights activities, events, and analyses of interest to public and private sector organizations associated with the natural gas industry. Volume and price data are presented each month for natural gas production, distribution, consumption, and interstate pipeline activities. Producer-related activities and underground storage data are also reported. From time to time, the NGM features articles designed to assist readers in using and interpreting natural gas information. The data in this publication are collected on surveys conducted by the EIA to fulfill its responsibilities for gathering and reporting energy data. Some of the data are collected under the authority of the Federal Energy Regulatory Commission (FERC), an independent commission within the DOE, which has jurisdiction primarily in the regulation of electric utilities and the interstate natural gas industry. Geographic coverage is the 50 States and the District of Columbia.

30595 (INIS-BR–2931) **Proceedings of the 3. International seminar on natural gas.** Instituto Brasileiro de Petroleo, Rio de Janeiro, RJ (Brazil). 1991 19p. (In Portugese). (CONF-9112131–: 3. international seminar on natural gas, Sao Paulo (Brazil), 4-6 Dec 1991). Order Number DE92001405. Source: OSTI; NTIS (US Sales Only); INIS.

Selected papers have been processed separately for inclusion in the data base.

30596 (INIS-BR–2931, pp. 108-118) **Methodological aspects of market study on residential, commercial and industrial sectors, of the Conversion Project for natural gas of existing network in Sao Paulo city.** Kishinami, R.I. (COPLASA S.A., Engenharia de Projetos, Sao Paulo, SP (Brazil)); Perazza, A.A. Instituto Brasileiro de Petroleo, Rio de Janeiro, RJ (Brazil). 1991. 19p. (In Portuguese). (CONF-9112131–: 3. international seminar on natural gas, Sao Paulo (Brazil), 4-6 Dec 1991). In *Proceedings of the 3. International Seminar on Natural Gas.* Order Number DE92001405. Source: OSTI; NTIS (US Sales Only); INIS.

The methodological aspects of market study, developed at the geographical area served by existing network of naphtha gas, which will be converted to natural gas in a two years conversion program are presented. (author).

30597 (INIS-BR–2931, pp. 277-284) **Natural gas participation on brazilian demand supply of liquefied petroleum gas.** Freitas Rachid, L.B. de (PETROBRAS, Rio de Janeiro, RJ (Brazil). Dept. de Producao). Instituto Brasileiro de Petroleo, Rio de Janeiro, RJ (Brazil). 1991. 19p. (In Portuguese). (CONF-9112131–: 3. international seminar on natural gas, Sao Paulo (Brazil), 4-6 Dec 1991). In *Proceedings of the 3. International Seminar on Natural Gas.* Order Number DE92001405. Source: OSTI; NTIS (US Sales Only); INIS.

Natural Gas Liquids Production, Liquefied Petroleum Gas (LPG) among them, has undergone a continuous growth and technological development until the first half of the eighties. This paper presents the natural gas processing activity development in Brazil, in the last 20 years, and the increasing share of LPG produced from natural gas in the supply of LPG domestic market. Possibilities of achieving greater shares are discussed, based on economics of natural gas processing projects. Worldwide gas processing installed capacity and LPG pricing tendencies, and their influence in the construction of new Natural Gas Processing Units in Brazil, are also discussed. (author).

0307 Waste Management

Refer also to citation(s) 30578

0308 Environmental Aspects

Refer also to citation(s) 30592

0310 Legislation and Regulations

Refer also to citation(s) 30593

0320 Transport, Handling, and Storage

Refer also to citation(s) 30592

30598 (NUTEK-NGAS–92-1) **Pilot plant for sealed gas-storage facility at Graengesberg (Sweden).** Knutsson, B. (Sydkraft Konsult AB, Malmoe (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Dec 1991. 73p. (In Swedish). Project NUTEK-654-013. Order Number DE92563030. Source: OSTI; NTIS.

A pilot plant for storage of natural gas was built 1988-89. This report comprises the second testing stage. made during 1990-91. The storage room has plate metal linings and the room was pressure tested up to 30 MPa. The water- and gas drainage system was tested at -25 degrees C and 15 MPa pressure. A final conclusion is that the plate metal concept is suited for full scale storage of natural gas under a pressure of 20-25 MPa. Tree alternative linings were tested, sheet metal, polyethylene and a thermoset plastic. Sheet metal and polyethylene may be possible alternatives to plate metal. The possibility to store natural gas under overpressure and low temperatures indicates that the plate metal lining concept is competitive to other sealing methods. (10 refs., 38 figs., 7 tabs.).

0330 Properties and Composition

Refer also to citation(s) 30470

0340 Combustion

Refer also to citation(s) 31109, 31189, 31190, 31408, 32522

04 OIL SHALES AND TAR SANDS

0404 Oil Production, Recovery, and Refining

30599 (DOE/MC/11089-3094-Vol.1) **Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 1, Task 1, PFH scoping studies and Task 2, PFH optimization studies: Final report, September 1987–May 1991.** Institute of Gas Technology, Chicago, IL (United States). Mar 1992. 125p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-87MC11089. Order Number DE92001283. Source: OSTI; NTIS; GPO Dep.

This project was conducted to establish the research base necessary to develop the new-generation pressurized fluidized-bed hydroretorting (PFH) process for retorting Eastern oil shales. The objective of Task 1, PFH Scoping Studies, was to determine the effects of process variables on Indiana New Albany shale product yields. The results of the lab-scale batch tests (Subtask 1.1) and lab-scale continuous tests (Subtask 1.2) were used in Task 2. The objective of Task 2, PFH Optimization Tests, was to obtain lab- and bench-scale data for optimizing the PFH process with six Eastern oil shales. Work in Task 2 included lab-scale batch tests with five key Eastern shales (Subtask 2.1), lab-scale continuous tests with the same five shales (Subtask 2.2), bench-scale tests with Indiana and Alabama shales (Subtask 2.3), and the analysis of data including development of carbon conversion and oil yield correlations (Subtask 2.4). Accomplishments for these tasks are presented in this report.

30600 (DOE/MC/11089-3094-Vol.2) **Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991.** Institute of Gas Technology, Chicago, IL (United States). Mar 1992. 308p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-87MC11089. Order Number DE92001284. Source: OSTI; NTIS; GPO Dep.

This final report, Volume 2, on "Process Improvement Concepts" presents the results of work conducted by the Institute of Gas Technology (IGT), the Illinois Institute of Technology (IIT), and the Ohio State University (OSU) to develop three novel approaches for desulfurization that have shown good potential with coal and could be cost-effective for oil shales. These are (1) In-Bed Sulfur Capture using different sorbents (IGT), (2) Electrostatic Desulfurization (IIT), and (3) Microbial Desulfurization and Denitrification (OSU and IGT). Results of work on electroseparation of shale oil and fines conducted by IIT is included in this report, as well as work conducted by IGT to evaluate the restricted pipe discharge system. The work was conducted as part of the overall program on "Pressurized Fluidized-Bed Hydroretorting of Eastern Oil Shales."

30601 (UCRL-JC-109241) **HRS pilot plant and modeling results.** Cena, R.J.; Thorsness, C.B. Lawrence Livermore National Lab., CA (United States). 17 Apr 1992. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9204147-5: 25. oil shale symposium, Golden, CO (United States), 21 Apr 1992). Order Number DE92019538. Source: OSTI; NTIS; GPO Dep.

At Lawrence Livermore National Laboratory, we are studying Hot-Recycled-Solid (HRS) oil shale retorting processes through a series of fundamental laboratory studies, operation of a 4 tonne-per-day HRS pilot plant and development of an Oil Shale Process (OSP) mathematical model. Results from the pilot plant and process model development are discussed in this paper. Over the last year, results from the pilot plant, using lean and rich shales (22 to 38 gallon-per-ton) have proven process viability in a robust design with no moving parts, utilizing gravity feed to fluid and packed-beds and pneumatic solids transport in a lift-pipe. Using the OSP process model,, which is under development, we critically assess pilot plant results while building a tool to aid in scaleup of the HRS process.

0405 Properties and Composition

30602 (UCRL-JC-109240) **Oil shale ash-layer thickness and char combustion kinetics.** Aldis, D.F.; Singleton, M.F.; Watkins, B.E.; Thorsness, C.B.; Cena, R.J. Lawrence Livermore National Lab., CA (United States). 15 Apr 1992. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9204147-4: 25. oil shale symposium, Golden, CO (United States), 21 Apr 1992). Order Number DE92019537. Source: OSTI; NTIS; GPO Dep.

A Hot-Recycled-Solids (HRS) oil shale retort is being studied at Lawrence Livermore National Laboratory. In the HRS process, raw shale is heated by mixing it with burnt retorted shale. Retorted shale is oil shale which has been heated in an oxygen deficient atmosphere to pyrolyze organic carbon, as kerogen into oil, gas, and a nonvolatile carbon rich residue, char. In the HRS retort process, the char in the spent shale is subsequently exposed to an oxygen environment. Some of the char, starting on the outer surface of the shale particle, is burned, liberating heat. In the HRS retort, the endothermic pyrolysis step is supported by heat from the exothermic char combustion step. The rate of char combustion is controlled by three resistances; the resistance of oxygen mass transfer through the gas film surrounding the solid particle, resistance to mass transfer through a ash layer which forms on the outside of the solid particles as the char is oxidized and the resistance due to the intrinsic chemical reaction rate of char and oxygen. In order to estimate the rate of combustion of the char in a typical oil shale particle, each of these resistances must be accurately estimated. We begin by modeling the influence of ash layer thickness on the over all combustion rate of oil shale char. We then present our experimental measurements of the ash layer thickness of oil shale which has been processed in the HRS retort.

30603 (UCRL-JC-109386) **Utilizing asphaltene pyrolysis to predict pyrolysis kinetics of heavy crude oil and extractable native bitumen.** Reynolds, J.G. Lawrence Livermore National Lab., CA (United States). 7 Jan 1992. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-921142-1: Eastern oil shale symposium, Lexington, KY (United States), 13-15 Nov 1992). Order Number DE92011531. Source: OSTI; NTIS; GPO Dep.

Selected heavy crude oils and extracted tar sand bitumens were separated into asphaltene and maltene fractions. The whole feeds and fractions were then examined by micropyrolysis at nominal constant heating rates from 1 to 50°C/min from temperatures of 250 to 650°C to establish evolution behavior, pyrolysate yields, and kinetics of evolution.

0407 Health and Safety

30604 (MSHA/IR-1203) **Injury experience in stone mining, 1990.** Mine Safety and Health Administration, Denver, CO (United States). 1990. 510p. Sponsored by Department of Labor, Washington, DC (United States). Order Number DE92018652. Source: OSTI; NTIS.

This Mine Safety and Health Administration (MSHA) informational report reviews in detail the occupational injury and illness experience of stone mining in the united States for 1990. Data reported by operators of mining establishments concerning work injuries are summarized by work location, accident classification, part of body injured, nature of injury, occupation, and principal type of mineral. Related information on employment, worktime, and operating activity also is presented. Data reported by independent contractors performing certain work at mining locations are depicted separately in this report. For ease of comparison with other metal and nonmetallic mineral mining industries and with coal mining, summary reference tabulations are included at the end of both the operator and the contractor sections of this report.

0430 Transport, Handling, and Storage

Refer also to citation(s) 30529

0440 Combustion

Refer also to citation(s) 32522

05 NUCLEAR FUELS

0501 Reserves, Exploration, and Mining

Refer also to citation(s) 31717

30605 (GSCAN-P–86-1A, pp. 385-391) **Age relationships from U-Th-Pb isotope studies of uranium mineralization in Wernecke breccias, Yukon Territory.** Archer, A. (Archer, Cathro and Associates (1981) Ltd., Vancouver, BC (Canada)). Geological Survey of Canada, Ottawa, ON (Canada). 1986. Project 750069;Project 780032. In *Current research. Part A.* 454p. Order Number DE92001408. Source: OSTI; NTIS (US Sales Only); INIS.

Pb-U ± Th isotope analyses for 17 specimens of uraniferous breccia from the northeastern Wernecke Mountains reveal several apparent ages for mineralization. The oldest date, 1194 Ma, reflects either initial emplacement of the breccias or their modification by effects of the Rackla of Rapitan (Windermere) thick clastic wedges and iron formation. The 510 Ma date reflects mid-Cambrian mineralization roughly coincident with regional uplift (and attendant karstification) and development of thick clastic wedges. This was also an important period for Pb-Zn mineralization. Younger dates resulted from continuing remobilization, and all isotopic ages for mineralized breccia reflect movements associated with the Richardson Fault array.

30606 (GSCAN-P–86-1A, pp. 531-540) **Developments in uranium geology in Canada, 1985.** Ruzicka, V. (Geological Survey of Canada, Ottawa, ON (Canada) Economic Geology and Mineralogy Division); LeCheminant, G.M. Geological Survey of Canada, Ottawa, ON (Canada). 1986. Project 750010. In *Current research. Part A.* 454p. Order Number DE92001408. Source: OSTI; NTIS (US Sales Only); INIS.

Field and laboratory investigations of uranium occurrences and deposits indicate that: the formation of the world's largest high grade uranium deposit at Cigar Lake, Saskatchewan, at 1.3 Ga was apparently contemporaneous with thermal events associated with intrusion of the Mackenzie dyke swarms; localization of the recently discovered polymetallic mineralization at Close Lake and Natona Bay, Saskatchewan is controlled by similar structural and lithological factors as the Cigar Lake deposit; elements and assemblages associated with polymetallic mineralization at Sand Lake, and key Lake in Saskatchewan, and at Long Lake, in New Brunswick; the chemical properties of carbon in uranium and gold bearing seams of the Elliot Lake deposits are consistent with kerogen and similar to kerogen from the Vaal Reef, Witwatersrand, South Africa.

30607 (GSCAN-P–86-1A, pp. 803-808) **Gold occurrence in radioactive calc-silicate float at Sandybeach Lake, Nueltin Lake area, District of Keewatin.** Charbonneau, B.W. (Geological Survey of Canada, Ottawa, ON (Canada) Resource Geophysics and Geochemistry Div.); Swettenham, S.S. Geological Survey of Canada, Ottawa, ON (Canada). 1986. Project 840026. In *Current research. Part A.* 454p. Order Number DE92001408. Source: OSTI; NTIS (US Sales Only); INIS.

Ground investigation of an airborne gamma-ray spectrometric anomaly characterized by high equivalent uranium and eU/eTh ratio has revealed boulders of white, chalky, tourmaline-bearing granite with up to 393 ppm eU contained mainly in uraninite. Adjacent to the granite is a well defined aeromagnetic anomaly where radioactive arsenopyrite-pyrrhotite-pyrite bearing calc-silicate float was found at two localities. These boulders contain significant gold concentrations (up to several ppm and with visible gold) and are enriched in U, W, Mo, and Co.

30608 (INIS-mf–13347) **Abstracts of the International Conference on Occupational Radiation Safety in Mining.** Canadian Nuclear Association, Toronto, ON (Canada). 1984 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstracts are provided for the 89 papers presented at this conference. They cover the areas of mine ventilation and engineering, instrumentation, dosimetry, and epidemiology, particularly in uranium mines.

30609 (INIS-mf–13347, pp. 1) **Pilot ALARA analysis applied to dose reduction in an underground uranium mine.** Canadian Nuclear Association, Toronto, ON (Canada); Denison Mines Ltd., Toronto, ON (Canada); Rio Algom Mines Ltd., Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/radiation protection; ALARA; CANADA; COST BENEFIT ANALYSIS; RADIATION DOSES; REGULATIONS; VENTILATION

30610 (INIS-mf–13347, pp. 1) **Radiation safety aspects of occupational areas at a Brazilian open-pit mine.** Carvalho, S.M. (Instituto de Radioprotecao e Dosimetria (IRD), Rio de Janeiro, RJ (Brazil)); Mouco, C.L.; Estrada, J.S.; Ney, C.V. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. SURFACE MINING/radiation protection; BRAZIL; RADIATION DOSES; URANIUM MINES

30611 (INIS-mf–13347, pp. 2) **A dynamic approach to the implementation of the optimization principle in uranium mines.** Fourcade, N. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)); Zettwoog, P. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/radiation protection; PERSONNEL DOSIMETRY; RADIATION DOSES

30612 (INIS-mf–13347, pp. 2-3) **Control of radiation hazards in uranium exploration.** Hussein, H.A. (Nuclear Materials Corp., Cairo (Egypt)); El-Naggar, A.M.; Hassan, M.A.; El-Assaly, F.M.; Abdel-Fattah, A.T. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOCHEMICAL SURVEYS/radiation protection; PROSPECTING/radiation protection; PROSPECTING; URANIUM ORES

30613 (INIS-mf–13347, pp. 3-4) **Radiation protection at a high grade uranium mine.** Meadley, T. (Amok Ltd., Saskatoon, SK (Canada)); Bundy, K.; Schidlowsky, W. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. CLUFF LAKE MINE/radiation protection

30614 (INIS-mf–13347, pp. 4) **Radon and radon daughter concentrations over an extended uranium ore body.** O'Brien, R.S. (Australian Radiation Laboratory, Yallambie (Australia)); Solomon, S.B.; Lokan, K.H.; Gan, T.H.; Martin, L.J.; Wise, K.N. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/surface air; URANIUM DEPOSITS/radon; AUSTRALIA; RADIOACTIVITY; RADON; WEATHER

30615 (INIS-mf--13347, pp. 4) **Randomization of grab sampling strategies for estimating the exposure of uranium miners to radon daughters.** Borak, T.B. (Colorado State Univ., Fort Collins, CO (United States). Dept. of Radiology and Radiation Biology); Holub, R.F. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/sampling; MINERS; PERSONNEL DOSIMETRY; RADON; SAMPLING; RANDOMNESS; URANIUM MINES

30616 (INIS-mf--13347, pp. 5) **The development, introduction and early operating experience of a large scale external gamma monitoring program in Canadian uranium mines.** Bradley, R.P. (Department of National Health and Welfare, Ottawa, ON (Canada). Radiation Protection Div.); Grogan, D. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/personnel dosimetry; GAMMA DOSIMETRY; MINERS

30617 (INIS-mf--13347, pp. 6) **Measurement of temporal variations in radon progeny working levels in mine atmospheres.** Roze, V. (Alpha Nuclear, Mississauga, ON (Canada)); Raz, R.; Bigu, J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/personnel dosimetry; MICROCOMPUTERS; RADON

30618 (INIS-mf--13347, pp. 7-8) **A study of the dose conversion factors for inhalation risk assessment from radon daughters in mine atmospheres.** Subba Ramu, M.C. (Bhabha Atomic Research Centre, Bombay (India)); Vohra, K.G. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/personnel dosimetry; AEROSOLS; LUNGS; RADIATION DOSES; RADON

30619 (INIS-mf--13347, pp. 9) **Are the current dose limits for uranium mines too high?.** Wright, M.J. (United Steelworkers of America (Canada)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/dose limits; CANADA; MINERS; RADIATION PROTECTION LAWS; URANIUM MINES

30620 (INIS-mf--13347, pp. 9) **The consequences of the latest ICRP recommendations on a revision of Publication 24.** Jammet, H. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire); Coulon, R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/dose limits; ICRP; MINERS; PERSONNEL DOSIMETRY; RADIATION PROTECTION; URANIUM MINES

30621 (INIS-mf--13347, pp. 10) **Problems in setting and applying limits for occupational exposure to radon daughters.** Bush, W.R. (Atomic Energy Control Board, Ottawa, ON (Canada)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/dose limits; ICRP; MINERS; PERSONNEL DOSIMETRY; RADON; URANIUM MINES

30622 (INIS-mf--13347, pp. 10-11) **Removal or airborne thoron (radon) daughters on mine walls and other surfaces by convective deposition and electrostatic plate-out.** Bigu, J. (Department of Energy, Mines and Resources, Elliot Lake, ON (Canada). Elliot Lake Lab.). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 220/deposition; DAUGHTER PRODUCTS; ELECTRIC FIELDS; DEPOSITION; URANIUM MINES

30623 (INIS-mf--13347, pp. 11) **Practical approach to retrospective estimation of radon daughter concentration in the underground mining environment.** Dory, A.B. (Atomic Energy Control Board, Ottawa, ON (Canada)); Corkill, D.A. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/radiation doses; DAUGHTER PRODUCTS; MINERS; PERSONNEL DOSIMETRY; QUANTITY RATIO; RADON 222; URANIUM MINES; VENTILATION

30624 (INIS-mf--13347, pp. 12) **Characterization of radioactive long-lived dust present in uranium mines and mills atmospheres.** Duport, P.J. (Canadian Inst. for Radiation Safety, Elliot Lake, ON (Canada)); Edwardson, E. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/dusts; ALPHA PARTICLES; DAUGHTER PRODUCTS; ORE PROCESSING; PARTICLE SIZE; POLONIUM 210; POLONIUM 218; RADON 220; RADON 226; THORIUM 230; DUSTS; URANIUM 234; URANIUM 238

30625 (INIS-mf--13347, pp. 13) **Radon emanation at the Muellenbach research uranium mine and its effects on ventilation planning.** Reimk (Federal Republic of Germany (DE)); Thome, M.; Haupt, W. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/ventilation; DAUGHTER PRODUCTS; FEDERAL REPUBLIC OF GERMANY; MATHEMATICAL MODELS; RADIATION PROTECTION; RADON 222; VENTILATION

30626 (INIS-mf--13347, pp. 26) **Physical and environmental surveillance in uranium exploration galleries.** Bassignani, A. (AGIP Nucleare, Milan (Italy)); Ippolito, D. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. EXPLORATION/radiation protection; EXPLORATION; MINERS; NATURAL RADIOACTIVITY; PERSONNEL DOSIMETRY; RADIATION DOSES; THERMOLUMINESCENT DOSEMETERS; URANIUM ORES

30627 (INIS-mf–13347, pp. 27) **Derived surface contamination limits for the uranium mining and milling industry.** Ching, S.H. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/contamination regulations; DOSE LIMITS; ORE PROCESSING

30628 (INIS-mf–13347, pp. 29-30) **Research and development of equipments of radon daughters in underground mines.** Pourprix, M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)); Vendel, J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINES/air cleaning; DAUGHTER PRODUCTS; MINES; RADIATION PROTECTION; RADON 222; VENTILATION

30629 (INIS-mf–13347, pp. 32) **Non-steady state radiation mine models: Practical applications to personal dosimetry and environmental monitoring.** Bigu, J. (Department of Energy, Mines and Resources, Elliot Lake, ON (Canada). Elliot Lake Lab.). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINES/mathematical models; AIR; DAUGHTER PRODUCTS; DEPOSITION; EMANOMETERS; MINES; RADIATION DOSES; RADON 220; RADON 222; VENTILATION

30630 (INIS-mf–13347, pp. 33) **Design for beta radiation protection in the mining and milling of high grade uranium ore.** Mernagh, J.R. (Toronto Univ., ON (Canada). Faculty of Medicine); Chambers, D.B. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/radiation doses; BETA PARTICLES; MINERS; RADIATION PROTECTION; URANIUM MINES

30631 (INIS-mf–13347, pp. 34) **Evaluation of a microcomputer system for controlling and monitoring radiation hazards in uranium mines.** Sheeran, C.T.; Franklin, J.C. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/ventilation; ON-LINE SYSTEMS; RADIATION MONITORING; RADON; VENTILATION

30632 (INIS-mf–13347, pp. 40) **Development of a joint labour-management safety inspection system at Denison operations.** Canadian Nuclear Association, Toronto, ON (Canada); Denison Mines Ltd., Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/occupational safety; CANADA; ORGANIZING

0504 Feed Processing

30633 (CEA-R–5569) **Low temperature sintering of hyperstoichiometric uranium dioxide.** Chevrel, H. CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Thermohydraulique et de Physique; Limoges Univ., 87 (France). Dec 1991. 144p. (In French). Order Number DE92566737. Source: OSTI; NTIS (US Sales Only); INIS.

In the lattice of uranium dioxide with hyperstoichiometric oxygen content (UO_{2+x}), each additional oxygen atoms is introduced by shifting two anions from normal sites to interstitial ones, thereby creating two oxygen vacancies. The point defects then combine to form complex defects comprising several interstitials and vacancies. The group of anions (3x) in the interstitial position participate in equilibria promoting the creation of uranium vacancies thereby considerably increasing uranium self-diffusion. However, uranium grain boundaries diffusion governs densification during the first two stages of sintering of uranium dioxide with hyperstoichiometric oxygen content, i.e., up to 93% of the theoretical density. Surface diffusion and evaporation-condensation, which are considerably accentuated by the hyperstoichiometric deviation, play an active role during sintering by promoting crystalline growth during the second and third stages of sintering. U_8O_8 can be added to adjust the stoichiometry and to form a finely porous structure and thus increase the pore area subjected to surface phenomena. The composition with an O/U ratio equal to 2.25 is found to densify the best, despite a linear growth in sintering activation energy with hyperstoichiometric oxygen content, increasing from 300 kj.mol^{-1} for $UO_{2.10}$ to 440 kJ.mol^{-1} for $UO_{2.25}$. Seeds can be introduced to obtain original microstructures, for example the presence of large grains in small-grain matrix.

30634 (CNIC–00344) **Preparation of uranium dioxide powder: Process for production coarse particle ADU precipitate in pilot plant.** Tang Yiru (Yibin Nuclear Fuel Element Plant, SC (China)); Duan Dezhi. China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 7p. (In Chinese). (NFE–0001.). Order Number DE93601310. Source: OSTI; NTIS (US Sales Only); INIS.

The precipitation process of coarse particle ADU precipitates production on pilot plant scale and its transformation into ceramic grade UO_2 power are described. Precipitation conditions, such as molar ratio of ammonia to uranium, uranium content, ammonium hydroxide content, temperature, rate of adding uranium, etc., have influences on ADU particle size, its microstructure and the properties of UO_2 powder. Test results show that UO_2 powder with particle size of 2 to 4 μm can be obtained by calcining and reducing ADU having an agglomerated particle size of 5 to 8 μm. Its volume density is greater than 1.4g/cm^3 and its specific surface area is greater than 3.5m^2/g, It can be pressed into final shape and sintered directly without grinding. The density of the UO_2 pellet can be up to 98% T.D.

0505 Uranium Enrichment

Refer also to citation(s) 30650, 30651, 31317, 31319

0507 Fuels Production and Properties

Refer also to citation(s) 30650, 30985, 30987, 30988, 30997, 31124, 32537

0508 Spent Fuels Reprocessing

Refer also to citation(s) 30699, 30741, 30742, 30772, 31305, 31306, 31308, 31309

30635 (ARH–59-Del.) **200 Areas operation monthly report, September 1967.** Corlew, R.P. Atlantic Richfield Hanford Co., Richland, WA (United States). 25 Oct 1967. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92040105. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Transfer from Isochem to Atlantic Richfield Hanford was successful. Full plant operation was resumed immediately after Labor Day.

Purex Plant began processing normal U fuel containing nondefense Pu. Operation of the Uranium Oxide Plant was resumed on Sept. 5; performance of concentration and calcination equipment was satisfactory. Operation of Pu recovery and processing facilities was also resumed; Pu metal button production was hampered, but deliveries were still on schedule. Repairs to the Pu incinerator were continued. Operation testing and calibration are underway for B Plant equipment. Processing of Shippingport blanket Am-Cm crude product was completed in Semiworks. About 600 gallons of sulfate-free 1WW waste was collected at Purex for Battelle-Northwest, but the chemistry did not match the suggested target limits. A new water line was installed in the 200 East Area. (DLC)

30636 (ARH–60-Del.) **200 Areas operation monthly report, October 1967.** Corlew, R.P. Atlantic Richfield Hanford Co., Richland, WA (United States). 22 Nov 1967. 54p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92040106. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Purex processing was hampered at first, but this was corrected during the switch to defense Pu processing. A 2-day maintenance outage was taken. Performance of concentration and calcination equipment in the Uranium Oxide Plant was satisfactory, as was the performance of the Pu recovery and processing facilities. The Pu incinerator was returned to service and performed well. Blending and casting of Pu ingots for ZPPR continued. Testing continued of Phase III equipment and systems at B Plant. Deactivation of Semiworks was started after decontamination by flushing. 28 casks of Battelle-Northwest high-level waste were unloaded and sent to underground storage. Use of K_2MnO_4 in Purex solvent treatment system was reduced by nearly 60%. The Pu and Np in Purex acid wastes are mostly associated with solids, and this can be reduced to less than 10% by eliminating the sulfate. Processing of Pu chloride scrap was started. Feasibility of producing Pu metal from Pu oxide in molten salt has been established. Hazards of burning Pu metal were found to be less than postulated; MgO sand is the best extinguishing agent. Color photographs confirm the bulged bottom in waste tank 108-SX. Two Pu nitrate shipments were received from West Valley. (DLC)

30637 (ARH–309-Del.) **200 Areas operation monthly report, October 1968.** Corlew, R.P. Atlantic Richfield Hanford Co., Richland, WA (United States). 22 Nov 1968. 49p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92040111. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Operation of the ARHCO-managed production facilities in the 200 Areas was satisfactory; output of Pu and U products met or exceeded requirements. The separation of nondefense Pu in the Purex Plant was completed; two grades (9.5 and 12 % Pu^{240}) were produced and segregated. Operations in the Plutonium Processing facility were satisfactory. Production of Pu oxide for FFTF was started. The Plutonium Recovery facility was hamped by dissolver equipment failures and incinerator repairs. A total of 1,591,000 gallons of waste was evaporated. The 4th campaign for processing Purex current acid waste through solvent extraction at B Plant was completed. About 64,000 gallons of supernatant waste were processed through the B Plant cesium ion exchange; the scrub step was determined to be inefficient in removing sodium from the cesium. Sluicing in one tank had little if any sludge removal. (DLC)

30638 (CNIC–00396) **Leaching process of nuclear fuel in leaching solution at sub-boiling temperature.** Zhang Qinfen (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Chen Yongqing; Liao Yuanzong; Sun Shuyun; Zhang Chiguang. China Nuclear Information Centre, Beijing, BJ (China). Mar 1990. 15p. (In Chinese). (IAE–0076.). Order Number DE93601314. Source: OSTI; NTIS (US Sales Only); INIS.

Effects of the leaching temperature and concentration of the nitric acid on the solubility of nuclear fuel have been investigated. Fuels were fed into the solution in simulation of continuous and batch mode and the effects of leaching temperature, nitric acid concentration and soluble neutron poison on the leaching rate were studied. The results showed that the increase of nitric acid concentration and leaching temperature can accelerate the fuel leaching rate. The releasing off-gas increased with the increase of feeding fuels. There was no effect of concentration Gd up to 3g/L in the nitric acid on the fuel leaching. It also demonstrated that the simulation of continuous leaching process at the Sub-boiling temperature of leaching solution was a suitable process beacause it could keep the leaching rate and off-gas flow not only rapidly but also smoothly and no gas peak appeared. The total volume of off-gas after the leaching process was calculated.

30639 (CNIC–00509) **Conceptual design of fixed bed burning system: A study of the head-end process for Th-U nuclear fuel cycle in HTGR.** Hu Xien (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Wang Xuejun; Dai Weizhi; Wan Chunrong. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 10p. (In Chinese). (TSHUNE–0018.). Order Number DE93601315. Source: OSTI; NTIS (US Sales Only); INIS.

The feasibility of removing graphite by fixed bed burning technology in the head-end process of HTGR graphite ball-element reprocessing is discussed. Parameters and conceptual flowsheet of burning process are given, and an improved design of a fixed bed burner is also presented.

30640 (FRCEA-TH–362) **Development of time-resolved laser fluorescence spectrometry for on-line uranium checking in solutions of the Purex reprocessing process.** Deniau, H. CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France); Paris-6 Univ., 75 (France). 25 Feb 1992. 278p. (In French). Order Number DE93701320. Source: OSTI; NTIS (US Sales Only); INIS.

The Purex process and the fluorescence spectrometry are first recalled, then uranyl fluorescence is studied in a pure nitric medium without other elements to establish a theoretical model, allowing the description of uranium fluorescence signal with a general equation. The influence of different parameters (temperature, inhibitors, dynamic quenching of iron and cerium) is investigated to develop the model. A quantitative analysis method without addition of reagents is proposed to validate the model.

30641 (INIS-mf–14064) **Investigations concerning the exchange of iodine from non-volatile organic iodine compounds. Final report.** Psarros, N.; Duschner, H.; Molzahn, D.; Schmidt, L.; Heise, S.; Jungclas, H.; Brandt, R.; Patzelt, P. Marburg Univ. (Germany). Fachgebiet Kernchemie; Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Oct 1990 20p. (In German). Contract BMFT 02W6039. Order Number DE93702329. Source: OSTI; NTIS (US Sales Only); INIS.

The iodine produced by nuclear fission is removed during the reprocessing of exhausted nuclear fuel elements by desorption achieving good decontamination factors. Nevertheless the further optimization of the process requires detailed information about the iodine speciation during fuel reprocessing, and about possible reactions. For the study of decomposition reactions of iodo-alcanes, which are built up during the fuel recycling process, we developed a method for the synthesis of labelled iodo-dodecane, which was used as tracer. In order to identify the iodo species in the organic phase of the reprocessing cycle we applied plasma desorption time-of-flight mass spectroscopy. The problem of the volatility of the iodo-compounds in the ultra vacuum of the mass spectrometer was overcome by derivatization of the iodo-alcanes with dithizon, which yielded non-volatile ionic alcyltetrazolium iodides. Beta-spectrometric analysis of the exhaust condensates collected from the organic phase of the WAK reprocessing cycle revealed beside iodine-129 the existence of a low-energetic beta emitter, which has yet to be identified. A literature survey on the topic was also performed. (orig.) With 42 refs., 9 figs.

30642 (ORNL/M–1947) **Impact of actinide recycle on nuclear fuel cycle health risks.** Michaels, G.E. Oak Ridge National Lab., TN (United States). Jun 1992. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019058. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this background paper is to summarize what is presently known about potential impacts on the impacts on the health risk of the nuclear fuel cycle form deployment of the Advanced Liquid Metal Reactor (ALMR)[1] and Integral Fast Reactor (IF)[2] technology as an actinide burning system. In a companion paper the impact on waste repository risk is addressed in some detail. Therefore, this paper focuses on the remainder of the fuel cycle.

30643 (ORNL/TM–12000) **The isolation of lutetium from gadolinium contained in Purex process solutions.** Bostick, D.T.; Vick, D.O.; May, M.P.; Walker, R.L. Oak Ridge National Lab., TN (United States). Sep 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92040946. Source: OSTI; NTIS; INIS; GPO Dep.

A chemical separation procedure has been devised to isolate Lu from Purex dissolver solutions containing the neutron poison, Gd. The isolation procedure involves the removal of U and >Pu from a dissolver solution using tributylphosphate solvent extraction. If required, solvent extraction using di-(2-ethylhexyl) phosphoric acid can be employed to further purify the sample be removing alkali and alkali earth elements. Finally, Lu is chromatographically separated from Gd and rare earth fission products on a Dowex 50W-X8 resin column using an alpha-hydroxyisobutyrate eluant. The success of the chemical separation procedure has been demonstrated in the quantitative recovery of as little as 1.4 ng Lu from solutions containing a 5000-fold excess of Gd. Additionally, Lu has been isolated from synthetic dissolver samples containing U, Ba, Cs, and Gd. Thermal emission MS data indicated that the Lu fraction of the synthetic sample was free of Gd interference.

0509 Transport, Handling, and Storage

Refer also to citation(s) 30663, 30670

30644 (CONF-9207102–58) **Uranium hexafluoride (UF_6) and 21 PF-1 overpack: Proposed rulemaking revisions.** Kovac, F.M. Oak Ridge National Lab., TN (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Institute of Nuclear Materials Management (INMM) annual meeting; Orlando, FL (United States); 19-22 Jul 1992. Order Number DE92019483. Source: OSTI; NTIS; INIS; GPO Dep.

Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations, parts 100–180, are the main regulations impacting the shipping of uranium hexafluoride (UF_6) in DOT 21 PF-1 overpacks. Intermittently, the regulations must be reviewed and revised to correct errors and to reflect changes which have occurred. A number of issues have been identified which the Department of Transportation, Research and Special Programs Administration (RSPA) should consider in updating the regulations.

30645 (ORNL/ER/Sub–92-SK263/1) **Leak testing plan for the Oak Ridge National Laboratory liquid low- level waste system (active tanks): Volume 1, Regulatory background and plan approach; Volume 2, Methods, protocols, and schedules; Volume 3, Evaluation of the ORNL/LT-823DP differential pressure leak detection method: Environmental Restoration Program.** Douglas, D.G. (Vista Research, Inc., Mountain View, CA (United States)); Wise, R.F.; Starr, J.W.; Maresca, J.W. Jr. Oak Ridge National Lab., TN (United States); Vista Research, Inc., Mountain View, CA (United States). Jun 1992. 195p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019278. Source: OSTI; NTIS; INIS; GPO Dep.

A leak testing plan for a portion of the Liquid Low-Level Waste (LLLW) system at the Oak Ridge National Laboratory (ORNL) is provided in the two volumes that form this document. This plan was prepared in response to the requirements of the Federal Facilities Agreement (FFA) between the US Department of Energy and two other agencies, the US Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC). The effective date of this agreement was 1 January 1992. The LLLW system is an interconnected complex of tanks and pipelines. The FFA distinguishes four different categories of tank and pipeline systems within this complex: new systems (Category A), doubly contained systems (Category B), singly contained systems (Category C), and inactive systems (Category D). The FFA's specific requirements for leak testing of the Category C systems is addressed in this plan. The plan also addresses leak testing of the Category B portions of the LLLW system. Leak testing of the Category B components was brought into the plan to supplement the secondary containment design demonstration effort that is under way for these components.

30646 (SAND–92-1409C) **Application of a safeguards radiation measurement system to the screening of spent fuel assemblies for transport and storage.** Ewing, R.I. Sandia National Labs., Albuquerque, NM (United States). [1992]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921102–18: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92018817. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. SPENT FUELS/iaea safeguards; GAMMA RADIATION/on-line measurement systems; NEUTRON EMISSION/on-line measurement systems; SPENT FUEL CASKS; TRANSPORT; CRITICALITY; OCCUPATIONAL SAFETY; BURNUP; ENRICHED URANIUM; DOSE RATES

30647 (SAND–92-1581) **Transportation Systems Center.** Greer, G.S. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019462. Source: OSTI; NTIS; GPO Dep.

The Transportation Systems Center at Sandia Laboratory performs research, development, and implementation of technologies that enhance the safe movement of people, goods, and information. Our focus is on systems engineering. However, we realize that to understand the puzzle, you must also understand the pieces. This brochure describes some of the activities currently underway at the Center and presents the breadth and depth of our capabilities. Please contact the noted individuals for more information.

30648 (SAND–92-1645C) **Sample Vial Secure Container (SVSC).** Baumann, M.J. (Sandia National Labs., Albuquerque, NM (United States)); Franssen, F. Sandia National Labs., Albuquerque, NM (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9207102–52: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019428. Source: OSTI; NTIS; GPO Dep.

International Atomic Energy Agency (IAEA) inspectors must maintain continuity of knowledge on all safeguard samples, and in particular on those samples drawn from plutonium product and spent fuel input tanks at a nuclear reprocessing plant's blister sampling station. Integrity of safeguard samples must be guaranteed from the sampling point to the moment of sample analysis at the IAEA's Safeguards Analytical Laboratory (SAL Seibersdorf) or at an accepted local laboratory. These safeguard samples are drawn at a blister sampling station with inspector participation, and then transferred via a pneumatic post system to the facility's analytical laboratory. The transfer of the sample by the pneumatic post system, the arrival of the sample in the operator's analytical laboratory, and the storage of the sample awaiting analysis is very time consuming for the inspector, particularly if continuous human surveillance is required for all these activities. This process might be observed by ordinary surveillance methods, such as a video monitoring system, but again this would be cumbersome and time consuming for both the inspector and operator. This paper will describe a secure container designed to assure sample vial integrity from the point the sample is drawn to the treatment of the sample at the facility's analytical laboratory.

30649 (WHC-SA–1570) **Quality performance-based training enhances safe and effective transport operations.** McCall, D.L. Westinghouse Hanford Co., Richland, WA (United States). Jun 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-920905–4: 10. international symposium on the packaging and transportation of radioactive materials: PATRAM '92, Yokohama (Japan), 13-18 Sep 1992). Order Number DE92019779. Source: OSTI; NTIS; INIS; GPO Dep.

A great deal of time, effort, and money is expended in the United States each year to achieve safety in transporting radioactive materials. Statistics support the fact that packaging system currently used for this purpose provide adequate safety. The high-quality packaging systems now used essentially eliminate the potential for major physical consequence to either the public or to the environment that could result from a radioactive material transportation incident. A major problem, however, remains. The institutional network in the United States, made up of the general public, special interest groups, Federal, state, local, and tribal government entities, remains to a major degree unimpressed with the US nuclear industry's performance. The institutional network knows that transport accidents occur daily and, as a result, safety during transport is continually questioned. Therefore, the question of whether the United States is putting enough emphasis on critical transport factors other than packaging, such as improving human performance to ensure safety and reduce the level of public concern, must be answered. This paper supports the belief that human performance and safe operations can be enhanced with performance-based, competency-demonstrated training, and that this type of training can also improve the institutional network's perception of US packaging and shipping activities. This paper discusses the need for performance-based training, identifies key program elements for effective training development, and describes several training courses sponsored by the US Department of Energy, Transportation Management Division, which demonstrate effective training.

0510 Economic, Industrial, and Business Aspects

Refer also to citation(s) 30664

30650 (ARH-307-Del.) **200 Areas operation monthly report, August 1968.** Atlantic Richfield Hanford Co., Richland, WA (United States). 22 Sep 1968. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92040109. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Operational information for August, 1968 is presented for various sections and departments of the Atlantic Richfield Hanford Company.(DT)

30651 (DOE/IG–92019403) **US Department of Energy Uranium Enrichment Activity: Financial statements, September 30, 1991 and 1990.** Peat Marwick, Knoxville, TN (United States). 16 Jun 1992. 41p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

KPMG Peat Marwick (KPMG), Certified Public Accountants, has completed its audit of the Department of Energy's Uranium Enrichment Activity (UEA) financial.statements as of September 30, 1991. The purpose of the audit was to determine whether (1) the financial statements were presented fairly in accordance with applicable accounting principles, (2) the auditee complied with all applicable laws and regulations that may have materially affected the financial statements, and (3) the internal accounting controls, taken as a whole, were adequate. The US Government, through the Department of Energy (DOE) and the management and operating contractor, operates the UEA to enrich uranium hexafluoride in the isotope U-235 for commercial power reactor operators, as further discussed in note 1 of the financial statements. The enrichment of uranium for Government program users, which had been a function of UEA, was transferred outside the UEA affective September 30, 1991, as described in note 3 of the financial statements. UEA is a part of DOE and does not exist as a separate legal entity. For financial reporting purposes, the entity is defined as those activities which provide enriching services to its customers. The financial statements are prepared by extracting and adjusting UEA related data from the financial records of DOE and its contractors.

0520 Waste Management

Refer also to citation(s) 30635, 30650, 30756, 30763, 30779, 30869, 30879, 30902, 30975, 30985, 30987, 31027, 31062, 31141, 31271, 31322, 31332, 31352, 31355, 31729, 31732, 31733, 31734, 31735, 31737, 31738, 31743, 31744, 31745, 31747, 31755, 31759, 32441, 32525, 32526, 32528, 32576

30652 (AECL–7822, pp. 1-4) **Introduction to transitional events workshop.** Scott, J.S. (Geological Survey of Canada, Ottawa, ON (Canada)). Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment. May 1984. (CONF-8211198–: Workshop on transitional processes, Ottawa (Canada), 4-5 Nov 1982). In *Proceedings of a workshop on transitional processes.* 308p. Order Number DE84901541. Source: OSTI; NTIS (US Sales Only); INIS.

The organization and objectives of the Canadian Nuclear Fuel Waste Management Program are reviewed. Research programs in geology, geophysics, rock properties and hydrogeology are being undertaken to provide the necessary scientific data to assess the concept of geological disposal, particularly as it relates to plutonic igneous rocks of the Ontario portion of the Canadian Shield. Data from each task within the program and from other waste management programs, must be digested and synthesized to form the basis for the development of a series of submodels representing major components of the waste management system: the geosphere, vault and biosphere. This provides input for a Systems Variability Analysis Code (SYVAC), which forms part of the basis for a Concept Assessment Document that will be presented to regulatory agencies and the public.

30653 (ANL–92/28) **Stress corrosion cracking of candidate waste container materials: Final report.** Park, J.Y. (Argonne National Lab., IL (United States)); Maiya, P.S.; Soppet, W.K.; Diercks, D.R.; Shack, W.J.; Kassner, T.F. Argonne National Lab., IL (United States); Lawrence Livermore National Lab., CA (United States). Jun 1992. 76p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92019239. Source: OSTI; NTIS; INIS; GPO Dep.

Six alloys have been selected as candidate container materials for the storage of high-level nuclear waste at the proposed Yucca mountain site in Nevada. These materials are Type 304L stainless steel (SS). Type 316L SS, Incoloy 825, phosphorus-deoxidized Cu, Cu-30%Ni, and Cu-7%Al. The present program has been initiated to determine whether any of these materials can survive for 300 years in the site environment without developing through-wall stress corrosion cracks. and to assess the relative resistance of these materials to stress corrosion cracking (SCC)- A series of slow-strain-rate tests (SSRTs) and fracture-mechanics crack-growth-rate (CGR) tests was performed at 93°C and 1 atm of pressure in simulated J-13 well water. This water is representative, prior to the widespread availability of unsaturated-zone water, of the groundwater present at the Yucca Mountain site. Slow-strain-rate tests were conducted on 6.35-mm-diameter cylindrical specimens at strain rates of 10-$^{-7}$ and 10^{-8} s^{-1} under crevice and noncrevice conditions. All tests were interrupted after nominal elongation strain of 1–4%. Scanning electron microscopy revealed some crack initiation in virtually all the materials, as well as weldments made from these materials. A stress- or strain-ratio cracking index ranks these materials, in order of increasing resistance to SCC, as follows: Type 304 SS < Type 316L SS < Incoloy 825 < Cu-30%Ni < Cu and Cu-7%Al. Fracture-mechanics CGR tests were conducted on 25.4-mm-thick compact tension specimens of Types 304L and 316L stainless steel (SS) and Incoloy 825. Crack-growth rates were measured under various load conditions: load ratios M of 0.5–1.0, frequencies of 10^{-3}-1 Hz, rise nines of 1–1000s, and peak stress intensities of 25–40 MPa·m $^{1/2}$.

30654 (ANL/CP–75688) **Molten salt/metal extractions for recovery of transuranic elements.** Chow, L.S.; Basco, J.K.; Ackerman, J.P.; Johnson, T.R. Argonne National Lab., IL (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209160–2: International symposium on energy, environment and information management, Argonne, IL (United States), 15-18 Sep 1992). Order Number DE92019600. Source: OSTI; NTIS; INIS; GPO Dep.

The integral fast reactor (EFR) is an advanced reactor concept that incorporates metallic driver and blanket fuels, an inherently safe, liquid-sodium-cooled, pool-type, reactor design, and on-site pyrochemical reprocessing (including electrorefining) of spent fuels and wastes. This paper describes a pyrochemical method that is being developed at Argonne National Laboratory to recover transuranic elements from the EFR electrorefiner process salt. The method uses multistage extractions between molten chloride salts and cadmium metal at high temperatures. The chemical basis of the salt extraction method, the test equipment, and a test plan are discussed.

30655 (CEA-CONF--10853) **The mass transfers of water by diffusion and permeation through a covering of wastes disposal.** Beaudoing, G. (CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees); Duding, B.; Margrita, R.; Launay, M.; Silvestre, P. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 3p. (CONF-9110410--: 3. International Land Fill Symposium, Cagliari (Italy), 14-18 Oct 1991). Order Number DE92566723. Source: OSTI; NTIS (US Sales Only); INIS.

The purpose of the experiments described in this article is to measure the transfer conditions similarly to the reality 'in situ', for a barrier constituted of sodic bentonite. For that purpose, these experiments were realized with a possibility of distension into the material receiving the membrane. The studied samples are constituted by a film of heavy, strong, durable and supple propylene coated with a bed of particles of sodic mineral bentonite. This clay is covered with a thin film of polyester for the mechanical protection (transport, placing). The characterisation of water transfer was realized with non mineral tritiated water HTO, nH$_2$0 with a specific activity of 37 GBq.m^{-3} (1 Ci.m^{-3}) and placed in the upward cavity of the permeameter. Diffusion, permeation and permeability coefficients are determined under pressure of 0.15.10^5 Pa (1.50 meter of water) and 10^5 Pa (10 meters of water).

30656 (CEA-CONF--10854) **Measure of water transfers by diffusion and permeation through materials.** Beaudoing, G. (CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees); Duding, B.; Launay, M.; Margrita, R.; Moulin, V.; Theyssier, M.; Levelut, M.N.; Convert, P. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 4p. (CONF-9110410--: 3. International Land Fill Symposium, Cagliari (Italy), 14-18 Oct 1991). Order Number DE92566724. Source: OSTI; NTIS (US Sales Only); INIS.

For urban, industrial or nuclear waste disposal, geomembranes are often used to isolate the wastes against infiltrations: either meteoric (rain water infiltrations) or ground water. The hydraulic behaviour studies of these materials and their evolution can be approached by the measure of the hydraulic parameters of water transfers: these parameters are the effective diffusion coefficient and the permeability coefficient. These measures have been realized on bituminous geomembranes samples of different qualities and of variable states of aging under mechanical, photochemical, physico-chemical and biological constraints. The experimental results show that: . the water transfer through these bitumen operate principally by diffusion, . the mechanical aging by traction influences more the diffusion coefficients (to the increase) than the natural aging (exposure to air, solar light, hydratation and drying, soaking with natural organic sequestering agents such as the humic acids).

30657 (CEA-CONF--10858) **Preliminary interpretation of the Libretto-2 experimental results in terms of tritium permeation barrier efficiency.** Leroy, P.; Franenberg, H.W.; Proust, E. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Mecanique et de Technologie. 1991. 19p. (CONF-911111--: International conference on fusion reactor materials, Clearwater, FL (United States), 17-22 Nov 1991). Order Number DE92566727. Source: OSTI; NTIS (US Sales Only); INIS.

Within the framework of a European Community programme aiming at the development of a water-cooled lithium-lead (Pb17Li) blanket concept for a demonstration fusion reactor, important experimental works are devoted to the development of efficient tritium permeation barriers. Among them, in-pile tests (LIBRETTO experiments) with closed capsules containing stagnant Pb17Li are intended to assess under irradiation the efficiency of these barriers. In this paper, a method for interpreting LIBRETTO data is presented, which relies on the use of a 2-dimensional finite element simulation model exploiting the analogy between tritium migration and heat conduction. Preliminary results obtained with this model are also discussed, which seem to indicate that, under conditions comparable with the experiment, the permeation barrier tested in LIBRETTO-2 would reduce tritium permeation by a factor of about 80.

30658 (CEA-CONF--10975) **An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations.** Escalier des Orres, P.; Granier, T.; Mohammadioun, B. CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire. 1992. 11p. (CONF-920430--: 3. international high level radioactive waste management (IHLRWM) conference, Las Vegas, NV (United States), 12-16 Apr 1992). Order Number DE93701093. Source: OSTI; NTIS (US Sales Only); INIS.

A regulatory guidance has been recently set up in France for the safety assessment of radwaste deep geological disposal: the present paper concerns the requirements related to bedrock stability issues and their technical background. This regulation relies in particular on a long term effort of the Protection and Nuclear Safety Institute (IPSN) of the French Atomic Energy Commission (CEA), which ensures two main duties: it carries out research programs in the area of protection and nuclear safety and provides expertise to the safety authorities. It should be noted that ANDRA (the French National Radioactive Waste Management Agency) is responsible for the safety of radioactive waste management and relies, for safety demonstration purposes, on its research programs. IPSN, in support of the safety authorities, is in charge of the verification of the applicant's safety demonstration and develops its own research programs in order to achieve an independent capability in safety analysis expertise. We present here the major axes of the Institute research program devoted to the assessment of seismic events consequences on the groundwater system. 19 refs., 8 figs.

30659 (CONF-921104--3) **Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation.** Perona, J.J. Oak Ridge National Lab., TN (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From American Institute of Chemical Engineers annual meeting; Miami, FL (United States); 1-6 Nov 1992. Order Number DE92019944. Source: OSTI; NTIS; INIS; GPO Dep.

Chabazite zeolites are used at ORNL for decontamination of wastewaters containing ^{90}Sr and ^{137}Cs. Treatability studies have shown that chabazite can remove trace amounts of these nuclides from wastewaters containing much higher concentrations of calcium and magnesium. The design of ion exchange columns for multicomponent systems requires a method for predicting multicomponent equilibria from binary or ternary experiments, since the number of experiments required for an empirical equilibrium model is generally not feasible. Binary interaction parameters for the Wilson equation were used to predict solid-phase activity coefficients for the five-component system, and the sum of squares of deviations between experimental and predicted solution concentrations for the data points available was calculated. The average deviation per data point for the five-component system was about the same as for the calcium-magnesium-sodium ternary system.

30660 (DOE/EA--0210) **Draft environmental assessment for characterization of the Hanford Site pursuant to the Nuclear Waste Policy Act of 1982 (Public Law 97-425), Hanford Site, Richland, Benton County, Washington.** Rockwell International Corp., Richland, WA (United States). Rockwell Hanford Operations. Feb 1983. 186p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-77RL01030. Order Number DE90006500. Source: OSTI; NTIS; INIS; GPO Dep.

The Hanford Site is evaluated in this draft environmental assessment. The results of this evaluation are the basis for nominating the Hanford Site for site characterization leading to selection of the first repository site. The major conclusions are presented. 120 refs., 26 figs., 8 tabs.

30661 (DOE/EH--231/004/0191(6/92)) **Regulated underground storage tanks.** USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). RCRA/CERCLA Div. Jun 1992. 456p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019847. Source: OSTI; NTIS; INIS; GPO Dep.

This guidance package is designed to assist DOE Field operations by providing thorough guidance on the underground storage tank (UST) regulations. [40 CFR 280]. The guidance uses tables, flowcharts, and checklists to provide a "roadmap" for DOE staff who are responsible for supervising UST operations. This package is tailored to address the issues facing DOE facilities. DOE staff should use this guidance as: An overview of the regulations for UST installation and operation; a comprehensive step-by-step guidance for the process of owning and operating an UST, from installation to closure; and a quick, ready-reference guide for any specific topic concerning UST ownership or operation.

30662 (DOE/EM-0080T) **Independent technical review of Savannah River Site Defense Waste Processing Facility technical issues.** USDOE Assistant Secretary for Environmental Restoration and Waste Management, Washington, DC (United States). Jul 1992. 90p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019798. Source: OSTI; NTIS; INIS; GPO Dep.

The Savannah River Site (SRS) Defense Waste Processing Facility (DWPF) will vitrify high-level radioactive waste that is presently stored as liquid, salt-cake, and sludge in 51 waste-storage tanks. Construction of the DWPF began in 1984, and the Westinghouse Savannah Company (WSRC) considers the plant to be 100% turned over from construction and 91% complete. Cold-chemical runs are scheduled to begin in November 1992, and hot start up is projected for June 1994. It is estimated that the plant lifetime must exceed 15 years to complete the vitrification of the current, high-level tank waste. In a memo to the Assistant Secretary for Defense Programs (DP-1), the Assistant Secretary for Environmental Restoration and Waste management (EM-1) established the need for an Independent Technical Review (ITR), or the Red Team, to "review process technology issues preventing start up of the DWPF." This report documents the findings of an Independent Technical Review (ITR) conducted by the Department of Energy (DOE), Office of Environmental Restoration and Waste Management (EM), at the request of the Assistant Secretary for Environmental Restoration and Waste Management, of specified aspects of Defense Waste Process Facility (DWPF) process technology. Information for the assessment was drawn from documents provided to the ITR Team by the Westinghouse Savannah River Company (WSRC), and presentations, discussions, interviews, and tours held at the Savannah River Site (SRS) during the weeks of February and March 9, 1992.

30663 (DOE/ID-10382-App.A-F) **Idaho National Engineering Laboratory response to the December 13, 1991, Congressional inquiry on offsite release of hazardous and solid waste containing radioactive materials from Department of Energy facilities.** Shapiro, C.; Garcia, K.M.; McMurtrey, C.D.; Williams, K.L.; Jordan, P.J. EG and G Idaho, Inc., Idaho Falls, ID (United States). May 1992. 2205p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019702. Source: OSTI; NTIS; INIS; GPO Dep.

This report is a response to the December 13, 1991, Congressional inquiry that requested information on all hazardous and solid waste containing radioactive materials sent from Department of Energy facilities to offsite facilities for treatment or disposal since January 1, 1981. This response is for the Idaho National Engineering Laboratory. Other Department of Energy laboratories are preparing responses for their respective operations. The request includes ten questions, which the report divides into three parts, each responding to a related group of questions. Part 1 answers Questions 5, 6, and 7, which call for a description of Department of Energy and contractor documentation governing the release of waste containing radioactive materials to offsite facilities. "Offsite" is defined as non-Department of Energy and non-Department of Defense facilities, such as commercial facilities. Also requested is a description of the review process for relevant release criteria and a list of all Department of Energy and contractor documents concerning release criteria as of January 1, 1981. Part 2 answers Questions 4, 8, and 9, which call for information about actual releases of waste containing radioactive materials to offsite facilities from 1981 to the present, including radiation levels and pertinent documentation. Part 3 answers Question 10, which requests a description of the process for selecting offsite facilities for treatment or disposal of waste from Department of Energy facilities. In accordance with instructions from the Department of Energy, the report does not address Questions 1, 2, and 3.

30664 (DOE/IG-92019402) **Report on Fiscal Year 1991 financial statement audit of the Low-Level Radioactive Waste Surcharge Escrow Account (CR-FC-92-1).** USDOE Office of Inspector General, Washington, DC (United States). Office of Assistant Inspector General for Audits. 26 Jun 1992. 16p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

The attached audit report on the subject account presents the opinion of the independent certified public accounts on financial statements as of September 30, 1991. In their opinion, the Surcharge Account statements are fairly presented in all material respects in accordance with generally accepted accounting principles. Also attached are reports on the internal control structure and compliance with laws and regulations, ass well as management's letter on addressing needed improvements.

30665 (DOE/LLW-111-Draft) **Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements.** EG and G Idaho, Inc., Idaho Falls, ID (United States); International Technology Corp., Denver, CO (United States). Jul 1991. 102p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (MISC-91090-Draft). Order Number DE92018815. Source: OSTI; NTIS; INIS; GPO Dep.

As directed by DOE-Headquarters and DOE-Idaho, the Radioactive Waste Technical Support Program (TSP) drafted an analysis of DOE Order 5820. 2A on "Radioactive Waste Management" to develop guidelines and criteria for revising the Order. This comparative matrix is a follow up to the earlier analysis. This matrix comparing the requirements of DOE Order 5820.2A with Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA) regulations was prepared at the request of EM-30. The matrix compares DOE Order 5820.2A with the following: NRC regulations in 10 CFR Part 61 on "Licensing Requirements for Land Disposal of Radioactive Waste"; NRC regulations in 10 CFR Part 60 on "Disposal of High-Level Radioactive Waste in Geologic Repositories"; EPA regulations in 40 CFR Part 191 on "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste"; EPA regulations in 40 FR Part 192 on "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailing"; and EPA regulations under the Resource Conservation and Recovery Act.

30666 (DOE/LLW-141) **Low-Level Radioactive Waste temporary storage issues.** EG and G Idaho, Inc., Idaho Falls, ID (United States). National Low-Level Waste Management Program. Apr 1992. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019892. Source: OSTI; NTIS; INIS; GPO Dep.

The Low-Level Radioactive Waste Policy Act of 1980 gave responsibility for the disposal of commercially generated low-level radioactive waste to the States. The Low-Level Radioactive Waste Policy Amendments Act of 1985 attached additional requirements for specific State milestones. Compact regions were formed and host States selected to establish disposal facilities for the waste generated within their borders. As a result of the Low-Level Radioactive Waste Policy Amendments Act of 1985, the existing low-level radioactive waste disposal sites will close at the end of 1992; the only exception is the Richland, Washington, site, which will remain open to the Northwest Compact region only. All host States are required to provide for disposal of low-level radioactive waste by January 1, 1996. States also have the option of taking title to the waste after January 1, 1993, or taking title by default on January 1, 1996. Low-level radioactive waste disposal will not be available to most States on January 1, 1993. The most viable option between that date and the time disposal is available is storage. Several options for storage can be considered. In some cases, a finite storage time will be permitted by the Nuclear Regulatory Commission at the generator site, not to exceed five years. If disposal is not available within that time frame, other options must be considered. There are several options that include some form of extension for storage at the generator site, moving the waste to an existing storage site, or establishing a new storage facility. Each of these options will include differing issues specific to the type of storage sought.

30667 (DOE/LLW–146) **Annotated list of regulations and guidance applicable to temporary storage of commercial Low-Level Radioactive Waste.** EG and G Idaho, Inc., Idaho Falls, ID (United States). National Low-Level Waste Management Program. Apr 1992. 63p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019893. Source: OSTI; NTIS; INIS; GPO Dep.

Compliance with the Low-Level Radioactive Waste Policy Amendments Act of 1985 (the Act) (Public Law 99-240), requires that States be responsible for the management and disposal of low-level radioactive waste (LLW) generated within their borders on January 1, 1993. Many States have indicated that they will not have LLW disposal capacity by the deadline and will need to consider other waste management options. A major option will be temporary storage of LLW. This document was prepared to help current and potential LLW storage management systems comply with applicable regulations. A list of major agencies and Federal laws applicable to storage of LLW and an annotated listing of regulations, guidance, and reference material applicable to temporary storage of LLW are provided. Also, the regulations and guidance are categorized into seven major areas of applicability concerning temporary storage of LLW. When considering temporary storage, States and compact regions have two broad options: (1) storage by the generators and brokers at the point of generation or collection, and (2) storage at a centralized temporary storage facility. Centralized temporary storage could take place at more than one facility, and States could choose to combine the options with some centralized storage and some storage at the generators.

30668 (DOE/NV/10576–T4) **Yucca Mountain Site Characterization Project Technical Data Catalog: Yucca Mountain Site Characterization Project.** USDOE Yucca Mountain Site Characterization Project Office, Las Vegas, NV (United States). 30 Jun 1992. 165p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-87NV10576. Order Number DE92019014. Source: OSTI; NTIS; INIS; GPO Dep.

The June 1, 1985 DOE/NRC Site-Specific Procedural Agreement for Geologic Repository Site Investigation and Characterization Program requires the DOE to develop and maintain a catalog of data which will be updated and provided to the NRC at least quarterly. This catalog is to include a description of the data; the time (date), place, and method of acquisition; and where it may be examined. The Yucca Mountain Site Characterization Project (YMP) Technical Data Catalog is published and distributed in accordance with the requirements of the Site-Specific Agreement. The YMP Technical Data Catalog is a report based on reference information contained in the YMP Automated Technical Data Tracking System (ATDT). The reference information is provided by Participants for data acquired or developed in support of the YMP. The Technical Data Catalog is updated quarterly and published in the month following the end of each quarter. This edition of the Technical Data Catalog supersedes the edition dated March 31, 1992.

30669 (DOE/NV/10576–T5) **Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project.** Sandia National Labs., Albuquerque, NM (United States); EG and G Energy Measurements, Inc., Las Vegas, NV (United States); Lawrence Livermore National Lab., CA (United States). [1992]. 275p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-87NV10576 ;AC04-76DP00789 ;W-7405-ENG-48 ;AC08-83NV10282. Order Number DE92019615. Source: OSTI; NTIS; GPO Dep.

The acquisition and development of technical data are activities that provide the information base from which the Yucca mountain Site will be characterized and may P-ventually be licensed as a high-level waste repository. The Project Technical Data Base (TDB) is the repository for the regional and site-specific technical data required in intermediate and license application analyses and models. The TDB Quarterly Report provides the mechanism for identifying technical data currently available from the Project TDB. Due to the variety of scientific information generated by YMP activities, the Project TDB consists of three components, each designed to store specific types of data. The Site and Engineering Properties Data Base (SEPDB) maintains technical data best stored in a tabular format. The Geographic Nodal Information Study and Evaluation System (GENISES), which is the Geographic Information System (GIS) component of the Project TDB, maintains spatial or map-like data. The Geologic and Engineering Materials Bibliography of Chemical Species (GEMBOCHS) data base maintains thermodynamic/geochemical data needed to support geochemical reaction models involving the waste package and repository geochemical environment. Each of these data bases are addressed independently within the TDB Quarterly Report.

30670 (DOE/OR–1047-D1) **Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Oak Ridge National Lab., TN (United States); Ebasco Services, Inc., Oak Ridge, TN (United States). Jul 1992. 242p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–2265). Order Number DE92040322. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents design demonstrations conducted of liquid low-level waste (LLLW) storage tank systems located at the Oak Ridge National Laboratory (ORNL). ORNL has conducted research in energy related fields since 1943. The facilities used to conduct the research include nuclear reactors, chemical pilot plants, research laboratories, radioisotope production laboratories, and support facilities. These facilities have produced a variety of radioactive and/or hazardous wastes. These wastes have been stored and transported through an extensive network of piping and tankage. Demonstration of the design of these tank systems has been stipulated by the Federal Facility Agreement (FFA) between the US Environmental Protection Agency (EPA) - Region IV; the Tennessee Department of Environment and Conservation (TDEC); and the DOE. The FFA establishes four categories of tanks. These are: Category A – New or Replacement Tank Systems with Secondary Containment; Category B – Existing Tank Systems with Secondary Containment; Category C – Existing Tank Systems without Secondary Containment; and Category D – Existing Tank Systems without Secondary Containment that are; Removed from Service. This document provides a design demonstration of the secondary containment and ancillary equipment of 11 tank systems listed in the FFA as Category "B." The design demonstration for each tank is presented in Section 2. The design demonstrations were developed using information obtained from the design drawings (as-built when available), construction specifications, and interviews with facility operators. The assessments assume that each tank system was constructed in accordance with the design drawings and construction specifications for that system unless specified otherwise. Each design demonstration addresses system conformance to the requirements of the FFA (Appendix F, Subsection C).

30671 (DOE/RL–88-27-Rev.2-Vol.2) **Grout treatment facility dangerous waste permit application: Revision 2: Volume 2.** USDOE Richland Field Office, WA (United States). Jul 1992. 968p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92019988. Source: OSTI; NTIS; INIS; GPO Dep.

Engineering drawings for this project are identified as CAPE-3036. Inquiries may be directed to: Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831.

The Grout Treatment Facility (GTF) will provide permanent disposal for approximately 43 Mgal of radioactive liquid waste currently being stored in underground tanks on the Hanford Site. The first step in permanent disposal is accomplished by solidifying the low-level liquid waste with cementitious dry materials. The resulting grout is cast within underground vaults. This report on the GTF contains information on the following: Hanford Site Maps, road evaluation for the grout treatment facility, Department of Ecology certificate of non-designation for centralia fly ash, double-shell tank waste compositional modeling, laboratory analysis reports for double-shell tank waste, stored in tanks 241-AN-103, 241-AN-106, and 241-AW-101, grout vault heat transfer results for M-106 grout formulation, test results for extraction procedure toxicity testing, test results for toxicity testing of double-shell tank grout, pilot-scale grout production test with a simulated low-level waste, characterization of simulated low-level waste grout produced in a pilot-scale test, description of the procedure for sampling nonaging waste storage tanks, description of laboratory procedures, grout campaign waste composition verification, variability in properties of grouted phosphate/sulfate N-reactor waste, engineering drawings, description of operating procedures, equipment list–transportable grout equipment, grout treatment facility–tank integrity assessment plan, long-term effects of waste solutions on concrete and reinforcing steel, vendor information, grout disposal facilities construction quality assurance plan, and flexible membrane liner/waste compatibility test results.

30672 (DOE/RL–88-27-Rev.2-Vol.3) **Grout treatment facility dangerous waste permit application: Revision 2: Volume 3.** USDOE Richland Field Office, WA (United States). Jul 1992. 872p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92019989. Source: OSTI; NTIS; INIS; GPO Dep.

Engineering drawings for this project are identified as CAPE-3036. Inquiries may be directed to: Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831.

The Grout Treatment Facility (GTF) will provide permanent disposal for approximately 43 Mgal of radioactive liquid waste currently being stored in underground tanks on the Hanford Site. The first step in permanent disposal is accomplished by solidifying the liquid waste with cementitious dry materials. The resulting grout is cast within underground vaults. This report on the GTF contains information on the following: Vault design, run-on/run-off control design, and asphalt compatibility with 90-degree celsius double-shell slurry feed.

30673 (DOE/RL–88-27-Rev.2-Vol.4) **Grout treatment facility dangerous waste permit application: Revision 2: Volume 4.** USDOE Richland Field Office, WA (United States). Jul 1992. 526p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92019990. Source: OSTI; NTIS; INIS; GPO Dep.

Engineering drawings for this project are identified as CAPE-3036. Inquiries may be directed to: Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831.

The Grout Treatment Facility (GTF) will provide permanent disposal for approximately 43 Mgal of low-level radioactive liquid waste currently being stored in underground tanks on the Hanford Site. The first step in permanent disposal is accomplished by solidifying the liquid waste with cementitious dry materials. The resulting grout is cast within underground vaults. This report on the GTF contains information on the following: Geologic data, hydrologic data, groundwater monitoring program, information, detection monitoring program, groundwater characterization drawings, building emergency plan–grout treatment facility, response action plan for grout treatment facility, Hanford Facility contingency plan, training course descriptions, overview of the Hanford Facility Grout Performance, assessment, bland use and zoning map, waste minimization plan, cover design engineering report, and clay liners (ADMIXTURES) in semiarid environments.

30674 (DOE/RL–92-34) **Hanford Federal Facility Agreement and Consent Order, quarterly progress report, March 31, 1992.** Westinghouse Hanford Co., Richland, WA (United States). May 1992. 111p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92019695. Source: OSTI; NTIS; INIS; GPO Dep.

This is the twelfth quarterly report as required by the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) (Ecology et al. 1990), established between the US Department of Energy (DOE), the US Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology). The Tri-Party Agreement sets the plan and schedule for achieving regulatory compliance and cleanup of waste sites at the Hanford Site. This report covers progress for the quarter that ended March 31, 1992. Topics covered under technical status include: disposal of tank wastes; cleanup of past-practice units; permitting and closure of treatment, storage, and disposal units; and other tri-party agreement activities and issues.

30675 (DOE/RL/11946–2-Vol.1) **Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1.** United Engineers and Constructors, Inc., Englewood, CO (United States). Western Operations. Jul 1992. 231p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-91RL11946. Order Number DE92019841. Source: OSTI; NTIS; INIS; GPO Dep.

Engineering drawings for this project are identified as CAPE-3035. Inquiries may be directed to: Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831.

This is a Conceptual Design Report (CDR) for the Waste Receiving and Processing (WRAP) Module 2A facility at Hanford Reservation. The mission of the WRAP Module 2A facility is to receive, process, package, certify, and ship for permanent burial at the Hanford site disposal facilities those contact handled (CH) low-level radioactive mixed wastes (LLMW) that: (1) are currently in retrievable storage at the Hanford Central Waste Complex (HCWC) awaiting a treatment capability to permit permanent disposal compliant with the Land Disposal Restrictions and; (2) are forecasted to be generated over the next 30 years. The primary sources of waste to be treated at WRAP Module 2A include the currently stored waste from the 183-H solar basin evaporators, secondary solids from the future Hanford site liquid effluent treatment facilities, thermal treatment facility ash, other WRAP modules, and other, miscellaneous waste from storage and onsite/offsite waste generators consisting of compactible and non-compactible solids, contaminated soils, and metals. This volume, Volume 1 provides a narrative of the project background, objective and justification. A description of the WRAP 2A mission, operations and project scope is also included. Significant project requirements such as security, health, safety, decontamination and decomissioning, maintenance, data processing, and quality are outlined. Environmental compliance issues and regulatory permits are identified, and a preliminary safety evaluation is provided.

30676 (DOE/RL/11946–2-Vol.3) **Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3.** United Engineers and Constructors, Inc., Englewood, CO (United States). Western Operations. Jul 1992. 1206p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-91RL11946. Order Number DE92019843. Source: OSTI; NTIS; INIS; GPO Dep.

Engineering drawings for this project are identified as CAPE-3035. Inquiries may be directed to: Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831.

This is part of a Conceptual Design Report (CDR) for the Waste Receiving and Processing (WRAP) Module 2A facility at the Hanford Reservation. The mission of the facility is to receive, process, package, certify, and ship for permanent burial at the Hanford site disposal facilities those contact handled (CH) low-level radioactive mixed wastes (LLMW) that: (1) are currently in retrievable storage at the Hanford Central Waste Complex (HCWC) awaiting a treatment capability to permit permanent disposal compliant with the Land Disposal Restrictions and; (2) are forecasted to be generated over the next 30 years. The primary sources of waste to be treated include the currently stored waste from the 183-H solar basin evaporators, secondary solids from the future Hanford site liquid effluent treatment facilities, thermal treatment facility ash, other WRAP modules, and other miscellaneous waste from storage and onsite/offsite waste generators consisting of compactible and non-compactible solids, contaminated soils, and metals. This volume, Volume III is a compilation of the outline specifications that will form the basis for development of the Title design construction specifications. This volume contains abbreviated CSI outline specifications for equipment as well as non-equipment related construction and material items. For process and mechanical equipment, data sheets are provided with the specifications which indicate the equipment overall design parameters. This volume also includes a major equipment list.

30677 (DOE/RL/11946–2-Vol.5) **Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5.** United Engineers and Constructors, Inc., Englewood, CO (United States). Western Operations. Jul 1992. 196p. Sponsored by USDOE, Washington, DC (United States).

DOE Contract AC06-91RL11946. Order Number DE92019844. Source: OSTI; NTIS; INIS; GPO Dep.

Engineering drawings for this project are identified as CAPE-3035. Inquiries may be directed to: Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831.

This is part of a Conceptual Design Report (CDR) for the Waste Receiving and Processing (WRAP) Module 2A facility at Hanford Reservation. The mission of the WRAP Module 2A facility is to receive, process, package, certify, and ship for permanent burial at the Hanford site disposal facilities those contact handled (CH) low-level radioactive mixed wastes (LLMW) that: (1) are currently in retrievable storage at the Hanford Central Waste Complex (HCWC) awaiting a treatment capability to permit permanent disposal compliant with the Land Disposal Restrictions and; (2) are forecasted to be generated over the next 30 years. The primary sources of waste to be treated at WRAP Module 2A include the currently stored waste from the 183-H solar basin evaporators, secondary solids from the future Hanford site liquid effluenttreatment facilities, thermal treatment facility ash, other WRAP modules, and other miscellaneous waste from storage and onsite/offsite waste generators consisting of compactible and non-compactible solids, contaminated soils, and metals. This volume, Volume V, provides a comprehensive conceptual design level narrative description of the process, utility, ventilation, and plant control systems. The feeds and throughputs, design requirements, and basis for process selection are provided, as appropriate. Key DOE/WHC criteria and reference drawings are delineated.

30678 (DOE/WIPP--92-024) **WIPP supplementary roof support system, Room 1, Panel 1: Geotechnical field data analysis bi-annual report.** Westinghouse Electric Corp., Carlsbad, NM (United States). Waste Isolation Div. [1992]. 81p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-86AL31950. Order Number DE92019366. Source: OSTI; NTIS; INIS; GPO Dep.

In June 1991, Waste Isolation Division (WID) initiated the design effort to develop a supplementary roof support system to extend the life of Room 1, Panel 1, to allow successful completion of the bin-scale test program. A number of potential options for ground control were considered leading to the finalization of the currently installed roof support system. This highly instrumented system is "state of the art" for mine ground control and will provide extensive geotechnical data. The system is an innovative blend of several standard techniques and incorporates five of the suggestions made by the Geotechnical Panel in its report of June 1991, on the effective life of Rooms in Panel 1. The design was subjected to an exhaustive scrutiny by two formal Design Review Panels and was approved based on reviewed design documents, on-site observations at the WIPP underground facility, and detailed discussions with members of the design team. The original requirement was to have only a section of the room completed in October in preparation for first waste receipt. This goal was met and the relatively complex installation in the entire room was completed in December 1991. The Support System, with all its instrumentation, is now fully operational and generating geotechnical data. Examination of extensometer, closure and load cell data indicate that Room support is performing within the design parameters. All the anchors were initially loaded to approximately 445 kN (1000 lbs). The results of load cell monitoring indicates a steady increase of load on the rock bolts. The anchors installed near the room centerline have shown the greatest increase with the outermost anchors showing little or no load.

30679 (ECN-C--91-048) **Progress report of the 600 m borehole project of the CEC programme on management and storage of radioactive waste: January-June 1991.** Hamilton, L.F.M. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jul 1991. 17p. Contract no. FI2W-CT90-0050 (TSTS);ECN project nr. 2254. Order Number DE93602339. Source: OSTI; NTIS; INIS.

This project forms part of the Radioactive Waste Programme of the Commission of the European Communities, Directorate-General for Science, Research and Development during the period 1990-1994.

In the framework of the CEC Programme on Radioactive Waste Disposal (1990-1994), in situ experiments in salt deposits are conducted. The experimental results will be used to validate analytical techniques and computer models for prediction of salt behaviour. The experiments take place in the Asse II salt mine in Germany. Progress of the work during the first half of 1990 is reported. Convergence data measured during the first phase of the project will be reported in the final report of phase I, issued mid 1991. Convergence measurement devices have been removed from the borehole and are temporarily stored to be used in a new 600 m deep borehole to be drilled begin 1992. The experiment with the Variable Pressure Device (VPD) started March 1991. During first 2 months it has been shown that low pressure build-up due to convergence could not be registrated. The system, which is basically designed for higher depths and thus higher convergence rates, showed more hysteresis than expected on the applied pressure levels. The measuring programme defined earlier is therefore modified. It will be concentrated first on high pressure changes which are started July 1991. A preliminary conclusion of the first pressure step is that the in-situ measured elasticity of salt is significantly lower than elasticity measured in the laboratory on small samples. More detailed analysis of the measurement results and repeated pressure steps are necessary to verify this conclusion. The predictive analyses planned for the first half of 1991 could not be made since the measuring programme was modified. FE-analyses have been concentrated on interpretation of the measurement result during the first months. Influence of the heat production of the exothermally hardening salt concrete in the behaviour of the borehole is analysed in detail. Predictions of the modified measuring programme (topical report) will be reported later. (author). 4 refs.; 3 figs.

30680 (ECN-C--91-051) **Comparative analysis of borehole interaction in the HAW test field.** Heijdra, J.J. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Aug 1991. 35p. Contract nr. FI-1W-0003-D(B). Order Number DE93602340. Source: OSTI; NTIS; INIS.

This work has been performed in the framework of the Commission of the European Communities R and D Programme on Management and Storage of Radioactive Waste.

A comparative finite element study has been performed on 2 models of the HAW test field, which is an underground experimental facility used for the investigation of the effects of storage of nuclear waste in salt formations. The HAW test field consists of 2 parallel galleries in an anticline type of salt formation. From each gallery 4 vertical boreholes have been drilled at equal distance in which electrical heaters or heat producing nuclear sources will be installed. In a former 3D analysis this HAW field has been modelled as if an infinite number of boreholes existed in each gallery which reduced the size of the model due to symmetry conditions. In order to investigate the influence of this assumption a comparison has been made between two models. One uses the actual 8 boreholes and the other is based on two infinite rows of holes. The comparison has been executed for a horizontal plane through the centre of the heat sources in which a state of plane strain has been assumed. From the analysis it appears that maximum compressive stress on the borehole liner can be determined with good accuracy with the model based on an infinite number of holes. For development of the compressive stress after longer periods of time however the comparison shows that the boundary conditions have a larger influence on the evolution of the stress on the liner. A full 3D analysis of the field will be required to account for geometry effects in a correct way. (author). 5 refs.; 21 figs.; 1 tab.

30681 (ECN-C--91-052) **Progress report of the ECN contribution to the experiments in the HAW project: 1st half year 1991.** Duijves, K.A.; Vonka, V. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Aug 1991. 16p. Contract nr. F12-0002-C(MB). Order Number DE93602341. Source: OSTI; NTIS; INIS.

This work has been performed in the framework of the Commission of the European Communities R and D Programme on Management and Storage of Radioactive Waste 1990-1994.

This report documents the progress of the ECN contribution in the High Active Waste Experiment, a large-scale in-situ test being performed underground in the Asse salt mine, Remlingen, FRG, during the period January 1st through March 31st, 1991. (A.S.). 3 refs.; 10 figs.

30682 (ECN-C--91-061) **Finite element analyses of a heater-interruption in the HAW test field.** Horn, B.A. van den. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Sep 1991. 33p. Contract nr. F1-1W-0003-D(B). Order Number DE93602343. Source: OSTI; NTIS; INIS.

This work has been performed in the framework of the Commission of the European Communities R and D Programme on Management and Storage of Radioactive Waste.

In this report the results of two finite element analyses of the HAW field are presented. The determination of the influence of a heater-interruption on the tube load as well as the differences in the evaluation of the tube load for both types of boreholes (type A and type B) are the main objectives of this report. Axisymmetric models are made for both type of boreholes in order to simulate this heater-interruption. It appeared that a heater-interruption of 4 hours leads to a temperature drop of 17.2deg C at the borehole wall and to a maximum reduction of the tube load of 1.76 MPa. About 20 days after reparation of the heaters of the heaters the evolution of the maximum temperature and the maximum tube load will be rehabilitated; the difference with the corresponding evolutions due to an uninterrupted heat-production are negligible. (author). 9 refs.; 25 figs.; 5 tabs.

30683 (ECN-C--91-079) **Ovality of the steel lining in the HAW test field.** Horn, B.A. van den. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Nov 1991. 23p. Contract F1-1W-0003-D(B). Order Number DE93602345. Source: OSTI; NTIS; INIS.

This work has been performed under contract, in the framework of the Commission of the European Communities R and D Programme on Management and Storage of Radioactive Waste.

Investigations have been made into the deformation behaviour of steel lining of the boreholes in the HAW test field, which is an underground experimental facility used for the investigation of he effects of storage of nuclear waste in salt formations. The HAW test field consists of two parallel galleries in an anticline type of salt formation. From each gallery four vertical boreholes have been drilled at equal distance. In two of these boreholes electrical heaters have been placed and in the remaining boreholes heat producing nuclear sources will be installed. A lining of steel has been placed into the boreholes to guarantee the continuous retrievability of the radio-active canisters over the complete test period. During the experiments with the electrically heated holes, ovality of the cross section of the lining was measured. The results of the investigation into a possible cause of this type of deformation are presented in this report. It was concluded that bending cannot be the cause of the ovality found in the lining. It is expected that the ovality is caused by pressure load variations in circumferential direction. (author). 6 refs.; 10 figs.; 4 tabs.

30684 (ECN-C--92-016) **Convergence measurements in a 300 m deep borehole in rock salt.** Heijdra, J.J.; Prij, J. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1992. 23p. Contract no. F12W-T90-0050. Order Number DE93602346. Source: OSTI; NTIS; INIS.

This work has been performed under contract, in the framework of the Commission of the European Communities R and D Programme on Management and Storage of Radioactive Waste.

An evaluation is presented of convergence measurements in a 300 m deep borehole in rock salt. The measured convergence is compared to the normalized convergence based on an analytical solution. Measurements endorse the assumptions on which the analytical solution has been based. With the aid of this analytical solution the ambient rock pressure at the locations of the measurements is determined. The derived pressures and the corresponding depth below the 750 m level are 20.3 MPa at -300 m, 15.4 MPa at -200 m and 13.3 MPa at -100 m. The measurements, normalized in order to account for the influence of the diameter and for the difference in depth, show good correspondence with former measurements on selected cavities in rock salt. (author). 6 refs.; 17 figs.; 3 tabs.

30685 (ECN-I--92-013) **Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor.** Bultman, J. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Apr 1992. 16p. Order Number DE93602330. Source: OSTI; NTIS; INIS.

Transmutation of long-lived fission products is of interest for the reduction of the possible dose to the population resulting from long-term leakage of nuclear waste from waste disposals. Three isotopes are of special interest: Tc-99, I-129 and Cs-135. Therefore, experiments on transmutation of these isotopes in nuclear reactors are planned. In the present study, the possible transmutation rates and mass reductions are determined for experiments in High Flux Reactor (HFR) located in Petten (Netherlands) and in Phenix (France). Also, rates were determined for a standard Light Water Reactor (LWR). The transmutation rates of the 3 fission products will be much higher in HFR than in Phenix reactor, as both total flux and effective cross sections are higher. For thick targets the effective half lives are approximately 3, 2 and 7 years for Tc-99, I-129 and Cs-135 irradiation respectively in HFR and 22, 16 and 40 years for Tc-99, I-129 and Cs-135 irradiation in Phenix reactor. The transmutation rates in LWR are low. Only the relatively large power of LWR guarantees a large total mass reduction. Especially transmutation of Cs-135 will be very difficult in Phenix and LWR, clearly shown by the very long effective half lives of 40 and 100 years, respectively. (author). 7 refs.; 5 figs.; 7 tabs.

30686 (EGG-M--92047) **Waste management in an environmental chemistry laboratory.** Bennett, J.T. Espinosa, J.M. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9204176--1: 3. annual regional conference on hazardous materials and hazardous wastes, Idaho Falls, ID (United States), 7-8 Apr 1992). Order Number DE92017948. Source: OSTI; NTIS; GPO Dep.

The operation of a safe and efficient waste management system in an environmental chemistry laboratory is a technically and administratively challenging task. Such a system must provide a safe working environment, satisfy regulatory requirements, and minimize both waste quantities and handling costs, all without adversely affecting the quality of the laboratory's chemical analysis activities. The waste management system of EG&G Idaho's Environmental Chemistry Unit is designed to accomplish the required system objectives through an organization structure of six major subsytems: Operation description, Waste identification, Waste storage, Waste handling, Waste characterization, and Waste disposition.

30687 (EUR--13851) **The HADES demonstration and pilot project on radioactive waste disposal in a clay formation.** Bonne, A. (Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)); Beckers, H.; Beaufays, R.; Buyens, M.; Coursier, J.; Bruyn, D. de; Fonteyne, A.; Genicot, J.; Lamy, D.; Meynendonckx, P.; Monsecour, M.; Neerdael, B.; Noynaert, L.; Voet, M.; Volckaert, G. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 280p. Source: OSTI; NTIS (US Sales Only); INIS.

The overall objective of the HADES programme is the evaluation of the technical feasibility and safety of the disposal of radwaste in a deep clay formation. The pilot phase is aimed at demonstrating the system behaviour for those components of the system and those operations and issues which can be demonstrated directly. The time period considered covers a first phase of the development programme of the pilot project which includes: -The construction of a concrete lined test drift of about 30 m length with a useful inner diameter of 3.5 m. In the lining, a number of openings or ports are foreseen for emplacing the various tests and sensors for the general auscultation in the host rock; - Mine-by test for the investigation of the response of the surrounding clay on the excavating; - CERBERUS test, a combined heating- irradiation test aiming at evaluating by simulation (electrical heaters and Co-60 radiation source) the impact of a HLW canister on its immediate near field; - Design of a gallery heating test for the demonstration by simulation of the behaviour of a concrete lined gallery structure and of the surrounding clay mass in a temperature field (TEMPPRES code for temperature and pressure evolution simulation). 21 refs.

30688 (EUR–13870/1) **Radioactive waste package assay facility. Volume 1. Application of assay technology.** Findlay, D.J.S. (UKAEA Harwell Lab. (United Kingdom)); Green, T.H.; Molesworth, T.V.; Staniforth, D.; Strachan, N.R.; Rogers, J.D.; Wise, M.O.; Forrest, K.R. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 170p. Contract FI1W0102/0244UK. Source: OSTI; NTIS (US Sales Only); INIS.

This report, in three volumes, covers the work carried out by Taylor Woodrow Construction Ltd., and two major sub-contractors: Harwell Laboratory (AEA Technology) and Siemens Plessey Controls Ltd., on the development of a radioactive waste package assay facility, for cemented 500 litre intermediate level waste drums. In volume 1, the reasons for assay are considered together with the various techniques that can be used, and the information that can be obtained. The practical problems associated with the use of the various techniques in an integrated assay facility are identified, and the key parameters defined. Engineering and operational features are examined and provisional designs proposed for facilities at three throughput levels: 15,000, 750 and 30 drums per year respectively. The capital and operating costs for such facilities have been estimated. A number of recommendations are made for further work. 16 refs., 14 figs., 13 tabs.

30689 (EUR–13870/2) **Radioactive waste package assay facility. Volume 2. Investigation of active neutron and active gamma interrogation.** Bailey, M. (UKAEA Harwell Lab. (United Kingdom)); Bunce, L.J.; Findlay, D.J.S.; Jolly, J.E.; Parsons, T.V.; Sene, M.R.; Swinhoe, M.T. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 233p. Contract FI1W0102/0244-UK. Source: OSTI; NTIS (US Sales Only); INIS.

Volume 2 of this report describes the theoretical and experimental work carried out at Harwell on active neutron and active gamma interrogation of 500 litre cemented intermediate level waste drums. The design of a suitable neutron generating target in conjunction with a LINAC was established. Following theoretical predictions of likely neutron responses, an experimental assay assembly was built. Responses were measured for simulated drums of ILW, based on CAGR, Magnox and PCM wastes. Good correlations were established between quantities of ^{235}-U, ^{nat}-U and D_2O contained in the drums, and the neutron signals. Expected sensitivities are -1g of fissile actinide and -100g of total actinide. A measure of spatial distribution is obtainable. The neutron time spectra obtained during neutron interrogation were more complex than expected, and more analysis is needed. Another area of discrepancy is the difference between predicted and measured thermal neutron flux in the drum. Clusters of small ^{3}He proportional counters were found to be much superior for fast neutron detection than larger diameter counters. It is necessary to ensure constancy of electron beam position relative to target(s) and drum, and prudent to measure the target neutron or gamma output as appropriate. 59 refs., 77 figs., 11 tabs.

30690 (EUR–13870/3) **Radioactive waste package assay facility. Volume 3. Data processing.** Creamer, S.C.; Lalies, A.A.; Wise, M.O. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 297p. Contract FI1W0102/0244-UK. Source: OSTI; NTIS (US Sales Only); INIS.

This report, in three volumes, covers the work carried out by Taylor Woodrow Construction Ltd, and two major sub-contractors: Harwell Laboratory (AEA Technology) and Siemens Plessey Controls Ltd, on the development of a radioactive waste package assay facility, for cemented 500 litre intermediate level waste drums. Volume 3, describes the work carried out by Siemens Plessey Controls Ltd on the data-processing aspects of an integrated waste assay facility. It introduces the need for a mathematical model of the assay process and develops a deterministic model which could be tested using Harwell experimental data. Relevant nuclear reactions are identified. Full implementation of the model was not possible within the scope of the Harwell experimental work, although calculations suggested that the model behaved as predicted by theory. 34 figs., 52 refs., 5 tabs.

30691 (EUR–13873) **Acoustic monitoring techniques for corrosion degradation in cemented waste canisters.** Naish, C.C. (UKAEA Harwell Lab. (United Kingdom)); Buttle, D.; Wallace-Sims, R.; O'Brien, T.M. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 37p. Contract FI1W-0229. Source: OSTI; NTIS (US Sales Only); INIS.

This report describes work carried out to investigate acoustic emission as a monitor of corrosion and degradation of wasteforms, in cemented containers, where the waste is a potentially reactive metal. Electronic monitoring equipment has been designed, built and tested to allow long-term monitoring of a number of waste packages simultaneously. Acoustic monitoring experiments were made on a range of 1 litre cemented Magnox and Aluminium samples cast into canisters comparing the acoustic events with hydrogen gas evolution rates and electrochemical corrosion rates. The attenuation of the acoustic signals by the cement grout under a range of conditions has been studied to determine the volume of wasteform that can be satisfactorily monitored by one transducer. The final phase of the programme monitored the acoustic events from full size (200 litre) cemented, inactive, simulated aluminium swarf waste packages prepared at AEA waste cementation plant at Winfrith. 3 refs., 17 figs., 2 tabs.

30692 (EUR–13879) **Quality assurance of radioactive waste packages by computerized tomography.** Reimers, P. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 74p. Contract FI1W-0037/0193. Source: OSTI; NTIS (US Sales Only); INIS.

According to task 3 'Testing and Evaluation of Conditioned Waste and Technical Barriers' quality assurance is a main scope of research concerned with the handling of radioactive waste. It was provided to characterize medium and high active waste by standard test methods which have been developed and experienced in this contract. Quality evaluation of radioactive waste packages is preferentially done by non-destructive testing methods. The main task of this contract was the elaboration of specific non-destructive testing methods for conditioned and sealed waste packages as well as for the matrix materials themselves (e.g. bitumen, concrete, ceramics and glass). CT with X-rays turned out to be one of the best methods for the comprehensive non-destructive characterization of the physical and technical properties of the above described test objects. The method is especially suitable for the non-destructive evaluation of the absolute density value, of the density distribution, of the gamma activity distribution, of the localization of voids, cracks and inclusions, of the visualization of swelling, shrinkage and phase precipitations, as well as the detection of liquid phases in bentonite and cemented waste. 9 refs., 10 figs., 2 tabs.

30693 (EUR–13882) **Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes.** Suarez, J.A. (Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Madrid (Spain)); Pina, G. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 109p. Contract FI1W-0226. Source: OSTI; NTIS (US Sales Only); INIS.

In this report, a non-destructive method on gamma spectrometry is investigated as a means of providing information on the radiological characteristics of low- and medium-level radioactive waste already packaged in drums. Experiments are reported using full-scale and mock-up scale homogeneous packages, in order to obtain real calibration curves and attenuation data, and heterogeneous packages in order to determine the influence of the concrete shield, and the distribution in the drum of radioactive materials, and collimation shape influence. For performing calibration curves and filters Europium-152 standard packages were employed and Cs-137, Co-60 and Mn-54 standard packages for quality control. Conclusions are presented on counting methods to provide a practically constant efficiency for any position in the drum and for any length, surface size or shape of the radioactive material. Calculation codes have been implemented to carry out the quantification of every packages studied. 37 figs., 35 tabs.

30694 (EUR–13883) **The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome.** Keiling, C. (Freie

Univ. Berlin (Germany)). Commission of the European Communities, Luxembourg (Luxembourg). 1992. 171p. Contract FI1W/0091. Source: OSTI; NTIS (US Sales Only); INIS.

Within the frame of this project the influence of the synthetic organic complexing agents dibutylphosphate, tributylphosphate, ethylenediamine-tetra acetic acid, citrate and oxalate on the solubilities, the migration and sorption behaviour of the elements iodine, cesium, uranium neptunium, plutonium and americium was investigated in electrolyte solutions, representing the conditions of a near field of a waste repository in a salt dome after an intrusion of brines, considered as a hypothetical scenario. The electrolyte solutions were saturated NaCl solution and Q-brine, which were equilibrated with corrosion products of the matrices Portland 35-F cement and bitumen (Shell Mexphalte R 80-100) before starting the experiments, in order to simulate their influence on the chemical behaviour of the solutions used for the experiments. The temperature, at which the experiments were carried out, was 298 K. After determining the relevant pH- and Eh-values, pH was adapted to 12.3 for saturated NaCl solution equilibrated with cement and to 6.4 for Q-brine also being at equilibrium with cement. The electrolyte systems on the other hand containing bitumen were kept at those pH-values, which resulted from saturation with the complexing agents. 120 tabs., 87 figs., 67 refs.

30695 (EUR–13918) **Survey of EEC solid waste arisings and performance of non-destructive assay systems.** Bremner, W.B. (UKAEA Dounreay Nuclear Power Development Establishment (United Kingdom)); Adaway, D.W.; Yates, A. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 27p. Contract FI1W/0249. Source: OSTI; NTIS (US Sales Only); INIS.

This report covers the work carried out during an one-year contract which surveyed the radioactive solid waste arisings in EEC Member States and also tabulated information on the performance of the non-destructive assay (NDA) system used. The work was jointly carried out with CEA partners at Cadarache and Paris. The tabulated data give information on types, packaging, associated activity, and NDA capability of the utilities or research organisations. Some short comings in NDA capabilities are identified and possible solutions are given.

30696 (EUR–13955) **Research on backfilling and sealing of Rooms and Galleries in a repository in salt.** Glaeb, F. (Gesellschaft fuer Strahlen- und Umweltforschung mbH Muenchen, Braunschweig (Germany). Inst. fuer Tieflagerung); Kappei, G.; Schmidt, M.W.; Schwieger, K; Starke, C.; Taubert, E.; Wallmueller, R.; Walter, F. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 256p. (In German). Contract FI1W/0059-D. Source: OSTI; NTIS (US Sales Only); INIS.

The multibarrier concept for the final disposal of radioactive wastes comprises backfilling and sealing of the mine in order to guarantee a safe enclosure of the waste. To provide for these properties, soil mechanical laboratory as well as geotechnical in situ measurements were carried out at the Asse mine. The soil mechanical investigations were performed on salt grit and precompacted backfilling material of different grain-size distribution and clay admixtures. They showed a significant dependence upon permeability and compression velocity of the type and quantity of clay used. A favourable grain-size distribution of the salt results in an acceleration of its compaction ability. Besides the investigation on a laboratory scale, first conclusions were obtained on the long-term in situ behaviour of backfilled chambers and seals and their corresponding geomechanical interaction with the surrounding rock. The geotechnical in situ stress and deformation measurements in an approximately 27.000 m^3 large chamber have so far shown no supporting effect against the surrounding rock four years after backfilling. A compaction of up to 3% of the backfill was registered. In situ measurements as well as laboratory tests on drilling cores from 60 years old backfill showed porosities of approximately 7% and a compaction effect of the backfill from the wall, decreasing towards the centre of the chamber due to the converging rock. 108 figs., 8 refs., 24 tabs.

30697 (EUR–13964) **Repository tunnel construction in deep clay formations.** Clarke, B.G. (Newcastle upon Tyne Univ. (United Kingdom)); Mair, R.J.; Taylor, R.N. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 120p. Contract FI1W/0200. Source: OSTI; NTIS (US Sales Only); INIS.

One of the objects of the Hades project at Mol, Belgium has been to evaluate the feasibility of construction of a deep repository in the Boom clay formation at depth of approximately 225 metres. The main objective of the present project was to analyse and interpret the detailed geotechnical measurements made around the Hades trial shaft and tunnel excavations and evaluate the safety of radioactive waste disposal in a repository facility in deep clay formations. Plasticity calculations and finite element analyses were used which gave results consistent with the in-situ measurements. It was shown that effective stress analysis could successfully predict the observed field behaviour. Correct modelling of the small-strain stiffness of the Boom clay was essential if reasonable predictions of the pore pressure response due to construction are to be made. The calculations undertaken indicated that, even in the long term, the pressures on the test drift tunnel lining are likely to be significantly lower than the overburden pressure. Larger long-term tunnel lining pressures are predicted for impermeable linings. A series of laboratory stress path tests was undertaken to determine the strength and stiffness characteristics of the Boom clay. The tests were conducted at appropriate effective stress levels on high-quality samples retrieved during construction of the test drift. The apparatus developed for the testing is described and the results discussed. The development of a self boring retracting pressure-meter is described. This novel in-situ testing device was specifically designed to determine from direct measurements the convergence/confinement curve relevant to tunnelling in clay formations. 44 refs., 60 figs., 3 tabs.

30698 (EUR–14082) **HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria.** Smith, B. (British Geological Survey, Keyworth (United Kingdom)). Commission of the European Communities, Luxembourg (Luxembourg). 1992. 53p. Contract FI1W/0203. Source: OSTI; NTIS (US Sales Only); INIS.

The work described in this report forms part of a multidisciplinary project, the broad objective of which is to study the ability of natural organic compounds present in groundwater to form mobile complexes with radionuclides. Other components of this work include the development of High Performance Liquid Chromatogaphic techniques (HPLC) to extract natural organic material from groundwater with minimal alteration, the separation of those organic fractions that complex with cations, and the development of geochemical speciation models to describe or predict metal binding. 17 Refs., 25 Figs., 4 Tabs.

30699 (FRCEA-TH–361) **Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes.** Casas i Garcia, J. CEA Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France); Universidad Politecnica de Cataluna, Barcelona (Spain). Escuela Tecnica Superior de Ingenieros de Caminos, Canales y Puertos. 13 Dec 1991. 333p. (In French). Contract FI 1W-0016F. Order Number DE93701319. Source: OSTI; NTIS (US Sales Only); INIS.

Reprocessing operations lead to the production of radioactive medium activity liquid waste which is treated by evaporation. The concentrates from reprocessing plant evaporators have to be stored in geological storage sites in view of their strong caesium, strontium and actinides activity. These elements, contained in acid and high sodium nitrate content liquid waste, are removed by means of selective extractants, using the supported liquid membrane technique (SLM), which allows them to be stored in surface sites, the actinides and long-life fission products being respectively recycled and concentrated into reduced volumes. The removal of the actinides is done by means of an Octyl N.N Diisobutyl Carbamoyl Methyl Phosphine Oxyde (C.M.P.O.) based liquid membrane, whereas the removal of the caesium and strontium involves crown ethers. Supported liquid membranes (S.L.M.s) have the advantage of implementing very small quantities of extractant, but, they generally have poor stability. The extractant, the diluent and the phase modifier that constitute the organic phase impregnating the membrane play a vital role in SLM stability; the support also affects stability by its nature and geometry. For the extraction of strontium, DtBu 18 C6 enables higher strontium transfer kinetics to be attained than with DC18 C6. As regards caesium, nDec B21 C7 is the most efficient. Unlike strontium, caesium cannot be quantitatively removed, due to the competition of sodium ions in the concentrate. Stable membranes are obtained with DC18 C6 or DtBu18 C6 diluted in alkylbenzene with an added phase modifier such as decanol or isotridecanol. The highest strontium transfer kinetics were obtained with the DC18 C6/hexylbenzene/isotridecanol mixture.

30700 (GSF–42/91) **Status report on geochemical modelling.** Read, D. (GSF - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Braunschweig (Germany). Inst. fuer Tieflagerung). GSF - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Neuherberg (Germany); Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Dec 1991. 199p. Contract BMFT KWA 5901. (GSF-TL–38/91). Order Number DE93702448. Source: OSTI; NTIS (US Sales Only); INIS.

This report describes the findings of a review undertaken on behalf of the project management group of the programme 'Endlagersicherheit in der Nachbetriebsphase' based at GSF-IfT (Forschungszentrum fuer Umwelt und Gesundheit - Institut fuer Tieflagerung) to establish the current status of research into the simulation of geochemical processes relevant to radiological assessment. The review is intended to contribute to Stage 1 of a strategy formulated to enhance the use of geochemical models in Germany. Emphasis has been placed on processes deemed to be of greatest relevance to performance assessment for a HLW-repository in a salt dome principally, speciation-solubility in high salinity solutions, complexation by natural organics and generation-transport of colloids. For each of these and other topics covered, a summary is given of fundamental concepts, theoretical representations and their limitations, highlighting, where appropriate, the advantages and disadvantages of alternative approaches. The availability of data to quantify any given representation is addressed, taking into account the need for information at elevated temperatures and pressures. Mass transfer is considered in terms of aqueous, particulate and gas-mediated transport, respectively. (orig.).

30701 (IAEA-TECDOC–661) **Review of available options for low level radioactive waste disposal.** International Atomic Energy Agency, Vienna (Austria). Jul 1992. 77p. Order Number DE93602349. Source: OSTI; NTIS (US Sales Only); INIS.

The scope of this report includes: descriptions of the options available; identification of important elements in the selection process; discussion and assessment of the relevance of the various elements for the different options; cost data indicating the relative financial importance of different parts of the systems and the general cost level of a disposal facility. An overview of the types of wastes included in low level waste categories and an approach to the LLW management system is presented. A generic description of the disposal options available and the main activities involved in implementing the different options are described. Detailed descriptions and cost information on low level waste disposal facility concepts in a number of Member States are given. Conclusions from the report are summarized. In addition, this report provides a commentary on various aspects of land disposal, based on experience gained by IAEA Member States. The document is intended to complement other related IAEA publications on LLW management and disposal. It also demonstrates that alternatives solutions for the final disposal of LLW are available and can be safely operated but the choice of an appropriate solution must be a matter for national strategy taking into account local conditions. 18 refs, 16 figs, 1 tab.

30702 (JAERI-M–91-216) **International Atomic Energy Agency co-operated research programme on the safety assessment of near-surface radioactive waste disposal facilities (NSARS): Results for Test Case 1 (earth trench case).** Takahashi, Tomoyuki (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Katoh, Kazuo; Kimura, Hideo; Matsuzuru, Hideo. Japan Atomic Energy Research Inst., Tokyo (Japan). Jan 1992. 39p. Order Number DE93703960. Source: OSTI; NTIS; INIS.

This report outlines the analytical work on the first test case, Test Case 1, specified by the IAEA sponsored co-operative research programme on the safety assessment of near-surface radioactive waste disposal facilities. Descriptions are provided on analytical methods used here, and the concept of an intrusion scenario which is not necessary fully specified in the Test Case 1. The Test Case 1 specifies two different concepts of wastes disposal, i.e., disposal in an earth trench and disposal in a engineered concrete vault, and two kinds of scenarios, i.e., groundwater migration and intrusion scenarios. This study concerns with the former disposal concept, and consists of the following analytical steps; release of radionuclides from the facility, vertical migration of radionuclides in an unsaturated zone, horizontal migration of radionuclides in a saturated zone, exposure dose to man via a drinking water pathway, and exposure dose to an intruder via a construction and residence-farm sub-scenarios. The results are presented in the standard form specified by the IAEA in the Test Case 1. (author).

30703 (KCP–613-4589) **Miscellaneous Waste Stream strategy document.** Stoltz, D.L. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Jul 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019474. Source: OSTI; NTIS; INIS; GPO Dep.

This strategy document addresses objectives and implementation for the Miscellaneous Waste Stream (MWS) program through FY1996. Its intention is to develop's comprehensive pollution prevention/hazard minimization program for MWS projects. The overall focus of this program is aimed at pollution prevention/hazard minimization for MWS processes and involves the elimination/minimization of processes and materials that result in pollutant releases to all environmental media. The document is divided into three categories of initial issues identified from funded MWS projects: waste streams, assessment tools, and waste characterization and worker exposure methods development. Initial strategy requires the development of a baseline of major waste streams at each facility and the identification of MWS issues and proposed solutions. Goals and schedules will evolve as these new issues are identified. Applicable pollution prevention/hazard minimization technologies will be identified, prioritized, and employed to address each issue commensurate with funding availability. Options will then be chosen and the proven technologies transferred to other sites, including commercial industry. Most notably, this strategy document calls for a 50 percent volume and toxicity reduction by CY1995 in the miscellaneous waste streams generated by processes within the MWS.

30704 (LA–12272-MS) **Materials compatibility and corrosion issues for accelerator transmutation of waste.** Staudhammer, K. Los Alamos National Lab., NM (United States). Aug 1992. 62p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019984. Source: OSTI; NTIS; INIS; GPO Dep.

The need to understand the materials issues in an accelerator transmutation of waste (ATW) system is essential. This report focuses on the spallation container material, as this material is exposed to some of the most crucial environmental conditions of simultaneous radiation and corrosion in the system. The most severe design being considered is that of liquid lead. In previous investigations of lead compatibility with materials, the chemistry of the system was derived solely from the corrosion products; however, in an ATW system, the chemistry of the lead changes not only with the derived corrosion products of the material being tested but also with the buildup of the daughter production with time. Daughter production builds up and introduces elements that may have a great effect on the corrosion activity of the liquid lead. Consequently, data on liquid lead compatibility can be regarded only as a guide and must be reevaluated when particular daughter products are added. This report is intended to be a response to specific materials issues and concerns expressed by the ATW design working group and addresses the compatibility/corrosion concerns.

30705 (LA-UR–92-1920) **Characterization of radioactive mixed wastes: The industrial perspective.** Leasure, C.S. Los Alamos National Lab., NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207126–1: 8. annual ACS/EPA waste, testing and quality assurance symposium, Washington, DC (United States), 16 Jul 1992). Order Number DE92017514. Source: OSTI; NTIS; INIS; GPO Dep.

Physical and chemical characterization of Radioactive Mixed Wastes (RMW) is necessary for determination of appropriate treatment options and to satisfy environmental regulations. Radioactive mixed waste can be classified as two main categories; contact-handled (low level) RMW and remote-handled RMW. Ibis discussion will focus mainly on characterization of contact handled RMW. The characterization of wastes usually follows one of two pathways: (1) characterization to determine necessary parameters for treatment or (2) characterization to determine if the material is a hazardous waste. Sometimes, however, wastes can be declared as hazardous waste without testing and then treated as hazardous waste. Characterization of radioactive mixed wastes pose some unique issues, however, that will require special solutions. Below, five issues affecting sampling and analysis of RMW will be discussed.

30706 (LA-UR–92-2071) **Cost performance assessment of in situ vitrification.** Showalter, W.E. (Los Alamos National Lab., NM (United States)); Letellier, B.C.; Booth, S.R.; Barnes-Smith, P. Los Alamos National Lab., NM (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206233–1: 16. annual army environmental quality R&D symposium, Williamsburg, VA (United States), 23-25 Jun 1992). Order Number DE92018983. Source: OSTI; NTIS; INIS; GPO Dep.

In situ vitrification (ISV) is a thermal treatment technology with promise for the destruction or immobilization of hazardous materials in contaminated soils. It has developed over the past decade to a level of maturity where meaningful cost effectiveness studies may be performed. The ISV process melts 4 to 25 m^2 of undisturbed soil to a maximum depth of 6 m into an obsidian-like glass waste form by applying electric current (3750 kill) between symmetrically spaced electrodes. Temperatures of approximately 2000°C drive off and destroy complex organics which are captured in an off-gas treatment system, while radio-nuclides are incorporated into the homogeneous glass monolith. A comparative life-cycle cost evaluation between mobile rotary kiln incineration and ISV was performed to quantitatively identify appropriate performance regimes and components of cost which are sensitive to the implementation of each technology. Predictions of melt times and power consumption were obtained from an ISV performance model over ranges of several parameters including electrode spacing, soil moisture, melt depth, electrical resistivity, and soil density. These data were coupled with manpower requirements, capitalization costs, and a melt placement optimization routine to allow interpolation over a wide variety of site characteristics. For the purpose of this study, a single site scenario representative of a mixed waste evaporation pond was constructed. Preliminary comparisons between ISV and incineration show that while operating costs are comparable, ISV avoids secondary treatment and monitored storage of radioactive waste that would be required following conventional incineration. It is the long term storage of incinerated material that is the most expensive component.

30707 (LA-UR–92-2288) **Processing flowsheet for the accelerator transmutation of waste (ATW) program.** Dewey, H.; Walker, R.; Yarbro, S. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921102–16: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92018287. Source: OSTI; NTIS; INIS; GPO Dep.

At Los Alamos, an innovative approach to transmuting long-lived radioactive waste is under investigation. The concept is to use a linear proton accelerator coupled to a solid target to produce an intense neutron flux. The intense stream of neutrons can then be used to fission or transmute long-lived radionuclides to either stable or shorter-lived isotopes. For the program to be successful, robust chemical separations with high efficiencies (>10^5) are required. The actual mission, either defense or commercial, will determine what suite of unit operations will be needed. If the mission is to process commercial spent fuel, there are several options available for feed preparation and blanket processing. The baseline option would be an improved PUREX system with the main alternative being the current ATW actinide blanket processing flowsheet. ^{99}Tc and ^{129}I are more likely to reach the biosphere than the actinides. Many models have been developed for predicting how the radionuclides will behave in a repository over long time periods. The general conclusion is that the actinides will be sorbed by the soil. Therefore, over a long time period, e.g., a million years their hazard will be lessened because of radioactive decay and dispersion. However, some of the long-lived fission products are not sorbed and could potentially reach the environment over a few thousand year period. Hence, they could present a significant safety hazard. Because of limited resources, most of the priority has been focused on the actinide and technetium blanket assemblies.

30708 (LA-UR–92-2306) **Waste crate counter design.** Langner, D.G.; Miller, M.C.; Wachter, J.R. Los Alamos National Lab., NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207102–31: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92018498. Source: OSTI; NTIS; INIS; GPO Dep.

We have examined a number of scenarios for configuring slab counters to measure low-level, noncompactable plutonium-bearing waste (LLW) and waste destined for burial at the Waste Isolation Pilot Plant (WIPP) facility. This system must be capable of discriminating waste that is above the 100-nCi/g level from waste that is below this level in reasonable measurement times in an environment susceptible to varying neutron backgrounds; must be able to measure higher level waste destined for the WIPP facility with a reasonable accuracy; and finally, must be somewhat transportable. The system will consist of four slabs each having twenty 152-cm-long ^{3}He tubes. With the four slabs placed optimally for the different types of waste containers, our calculations predict a detection efficiency of about 4.5% in the center between the four slabs. These calculations also predict that the system will be able to discriminate the LLW in 1 to 12 h, depending on the neutron background, and that the system will be able to measure WIPP crates to a 1-σ accuracy of about 20% for loadings near the WIPP upper limit. Our calculations have shown that this latter accuracy is determined primarily by the geometric response of the counters rather than the count time.

30709 (LA-UR–92-2331) **Nondestructive assays of 55-gallon drums containing uranium and transuranic waste using passive-active shufflers.** Rinard, P.M.; Adams, E.L.; Menlove, H.O.; Sprinkle, J.K. Jr. Los Alamos National Lab., NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207102–45: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92018918. Source: OSTI; NTIS; INIS; GPO Dep.

A passive-active neutron shuffler for 55-gal. drums of waste has been characterized using more than 1500 active and 500 passive assays on drums with 28 different matrices. Flux-monitor corrections have been improved, the assay accuracy with localized fissile materials in a drum has been characterized, and improvements have been suggested. Minimum detectable masses for $_{235}$U with active assays and ^{240}Pu$_{eff}$ with passive assays are presented for the various amounts of moderators and absorbers studied.

30710 (NUREG/CR–5685) **Sealing performance of bentonite and bentonite/crushed rock borehole plugs.** Ouyang, S. (Arizona Univ., Tucson, AZ (United States). Dept. of Mining and Geological Engineering); Daemen, J.J.K. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Regulatory Applications; Arizona Univ., Tucson, AZ (United States). Dept. of Mining and Geological Engineering. Jul 1992. 315p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; GPO.

This study includes a systematic investigation of the sealing performance of bentonite and bentonite/crushed rock plugs. American Colloid C/S granular bentonite and crushed Apache Leap tuff have been mixed to prepare samples for laboratory flow testing. Bentonite weight percent and crushed tuff gradation are the major variables studied. The sealing performance assessments include high injection pressure flow tests, polyaxial flow tests, high temperature flow tests, and piping tests. The results indicate that a composition to yield a permeability lower than 5 × 10^{-8} cm/s would have at least 25% bentonite by weight mixed with well-graded crushed rock. Hydraulic properties of the mixture plugs may be highly anisotropic if significant particle segregation occurs during sample installation and compaction. Temperature has no significant effect on the sealing performance within the test range from room temperature to 600°C. Piping damage to the sealing performance is small if the maximum hydraulic gradient does not exceed 120 and 280 for samples with a bentonite content of 25 and 35%, respectively. The hydraulic gradients above which flow of bentonite may take place are deemed critical. Analytical work includes the introduction of bentonite occupancy percentage and water content at saturation as two major parameters for plug design. A permeability model is developed for the prediction of permeability in clays, especially in view of the difficulties in obtaining this property experimentally. A piping model is derived based on plastic flow theory. This piping model permits the estimation of critical hydraulic gradients at which flow of bentonite takes place. The model can also be used to define the maximum allowable pore diameter of a protective filter layer.

30711 (PNL–7645) **Radioactive waste management in the USSR: A review of unclassified sources: Volume 2.** Bradley, D.J. Pacific Northwest Lab., Richland, WA (United States). Mar 1991. 124p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019007. Source: OSTI; NTIS; INIS; GPO Dep.

The Soviet Union does not currently have an overall radioactive waste management program or national laws that define objectives, procedures, and standards, although such a law is being developed, according to the Soviets. Occupational health and safety does not appear to receive major attention as it does in Western nations. In addition, construction practices that would be considered marginal in Western facilities show up in Soviet nuclear power and waste management operations. The issues involved with radioactive waste management and environmental restoration are being investigated at several large Soviet institutes; however, there is little apparent interdisciplinary integration between them, or interaction with the USSR Academy of Sciences. It is expected that a consensus on technical solutions will be achieved, but it may be slow in coming, especially for final disposal of high-level radioactive wastes and environmental restoration of contaminated areas. Meanwhile, many treatment, solidification, and disposal options for radioactive waste management are being investigated by the Soviets.

30712 (PNL-SA–20275) **Public involvement in the Hanford Double-Shell Tank waste disposal program.** Triplett, M.B.; Hunter, V.L. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206114–16: Annual meeting of the Air and Waste Management Association (AWMA), Kansas City, MO (United States), 21-26 Jun 1992). Order Number DE92019105. Source: OSTI; NTIS; INIS; GPO Dep.

Hanford's Double-Shell Tank (DST) waste disposal program was redefined following serious challenges to the viability of the previous strategy due to increased regulatory requirements and operating expectations. Redefinition of the DST waste disposal program involved a far-reaching set of decisions and actions. A formal stakeholder involvement process was used to bring the concerns of outside groups into the definition and evaluation of alternative tank waste disposal strategies, broadening the participation and ownership of the revised pregrain. Hanford's Double-Shell Tank (DST) waste disposal strategy, calls for using B-Plant to separate the low-level and high-level portions of the DST waste. This separations step would provide feed to the Hanford Waste Vitrification Plant (HWVP), viewed by many as the cornerstone to Site cleanup. The State of Washington strongly opposed using the 47-year-old B-Plant because it was not built to comply with current environmental regulations. Because of this and other challenges to Hanford's tank waste disposal strategy, the Department of Energy (DOE) Richland Field Office (RL) initiated efforts to redefine the strategy. To support this effort, Pacific Northwest Laboratory (PNL) and Westinghouse Hanford Company (WHCP) sought input from outside stakeholder groups (stakeholders are those interest groups that are affected by the outcome of the decision and have a strong desire to ensure that their concerns are addressed) through a formal stakeholder involvement and multi-attribute utility (MAU) analysis process. This paper describes that process and its results.

30713 (PNL-SA–20430) **Foreign experience in extended dry storage of spent nuclear fuel.** Schneider, K.J.; Mitchell, S.J. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9207102–48: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019371. Source: OSTI; NTIS; INIS; GPO Dep.

Most countries with nuclear power are planning for spent nuclear fuel (or high-level waste from reprocessing of spent fuel) to be disposed of in national deep geological repositories starting in the time period of about 2010 to 2050. While spent fuel has been stored in water basins for the early years after discharge from the reactors, interim dry storage for extended periods (i.e., several tens of years) is being implemented or considered in an increasing number of countries. Dry storage technology is generally considered to be developed on a world-wide basis, and is being initiated and/or expanded in a number of countries. This paper presents a summary of status and experience in dry storage of spent fuel in other countries, with emphasis on zirconium-clad fuels. Past activities, current status, future plans, research and development, and experience in dry storage are summarized for Argentina, Canada, France, former West Germany, former East Germany, India, Italy, Japan, South Korea, Spain, Switzerland, United Kingdom, and the former Soviet Union. Conclusions from their experience are presented. Their experience to date supports the expectations that proper dry storage should provide for safe extended dry storage of spent fuel.

30714 (PNL-SA–20460) **Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction.** Maiti, T.C.; Kaye, J.H. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206183–2: 2. international symposium on nuclear analytical chemistry, Toronto (Canada), 3-5 Jun 1992). Order Number DE92019082. Source: OSTI; NTIS; INIS; GPO Dep.

An improved method has been developed to concentrate the major alpha-emitting actinide elements neptunium, plutonium, and americium from samples with high salt content such as those resulting from efforts to characterize Hanford storage tank waste. Actinide elements are concentrated by coprecipitation of their hydroxides using iron carrier. The iron is removed by extraction from 8M HCl with 2-heptanone. The actinide elements remain in the aqueous phase free from salts, iron, and long-lived fission products. Recoveries averaged 98 percent.

30715 (PNL-SA–21033) **A Remote Characterization System for subsurface mapping of buried waste sites.** Sandness, G.A. (Pacific Northwest Lab., Richland, WA (United States)); Bennett, D.W.; Martinson, L. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920606–38: American Nuclear Society annual meeting, Boston, MA (United States), 7-12 Jun 1992). Order Number DE92019087. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes a development project that will provide new technology for characterizing hazardous waste burial sites. The project is a collaborative effort by five of the national laboratories, involving the development and demonstration of a remotely controlled site characterization system. The Remote Characterization System (RCS) includes a unique low-signature survey vehicle, a base station, radio telemetry data links, satellite-based vehicle tracking, stereo vision, and sensors for non-invasive inspection of the surface and subsurface.

30716 (RFP–4604) **Preliminary assessment of RTR and visual characterization for selected waste categories.** Ziegler, D.L. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. 24 Jun 1992. 65p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. Order Number DE92018620. Source: OSTI; NTIS; INIS; GPO Dep.

The first transuranic (TRU) waste shipped to the Waste Isolation Pilot Plant (WIPP) will be for the WIPP Experimental Program. The purpose of the Experimental Program is to determine the gas generation rates and potential for gas generation by the waste after it has been permanently stored at the WIPP. The first phase of these tests will be performed at WIPP with test bins that have been filled and sealed in accordance with the test plan for bin scale tests. A second phase of the testing, the Alcove Test, will involve drummed waste placed in sealed rooms within WIPP. A preliminary test was conducted at the Rocky Flats Plant (RFP) to evaluate potential methods for use in the characterization of waste. The waste material types to be identified were as defined in the bin-scale test plan – Cellulosics, Plastic, Rubber, Corroding Metal/Steel, Corroding Metal/Aluminum, Non-corroding Metal, Solid Inorganic, Inorganic Sludges, other organics and Cements. A total of 19 drums representing eleven different waste types (Rocky Flats Plant – Identification Description Codes (IDC)) and seven different TRUCON Code materials were evaluated. They included Dry Combustibles, Wet Combustibles, Plastic, light Metal, Glass (Non-Raschig Ring). Raschig Rings, M_gO crucibles, HEPA Filters, Insulation, Leaded Dry Box Gloves, and Graphite. These Identification Description Codes were chosen because of their abundance on plant, as well as the variability in drum loading techniques. The goal of this test was to evaluate the effectiveness of RTR inspection and visual inspection as characterization methods for waste. In addition, gas analysis of the head space was conducted to provide an indication of the types of gas generated.

30717 (SAND–85-0004) **Total System Performance Assessment Code (TOSPAC): Volume 2, User's guide: Yucca Mountain Site Characterization Project.** Gauthier, J.H. (Spectra Research Inst., Albuquerque, NM (United States)); Dudley, A.L; Skinner, L.H.; Wilson, M.L.; Peters, R.R. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 320p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019324. Source: OSTI; NTIS; INIS; GPO Dep.

TOSPAC is a computer program that calculates partially saturated groundwater flow with the transport of water-soluble contaminants. TOSPAC Version 1 is restricted to calculations involving one-dimensional, vertical columns of one or more media. TOSPAC was developed to help answer questions surrounding the burial of toxic wastes in arid regions. Burial of wastes in arid regions is attractive because of generally low population densities and little groundwater flow, in the unsaturated zone, to disturb the waste. TOSPAC helps to quantify groundwater flow and the spread of contamination, offering an idea of what could happen in the distant future. Figure 1.1 illustrates the problem TOSPAC was designed to investigate. For groundwater flow, TOSPAC can provide saturations, velocities, and and travel tunes for water in the rock matrix or the fractures in the unsaturated zone. TOSPAC can determine how hydrologic conditions vary when the rate of infiltration changes. For contaminant transport, TOSPAC can compute how much of a contaminant is dissolved in the water and how it is distributed. TOSPAC can determine how fast the solute is moving and the shape of the concentration front. And TOSPAC can be used to investigate how much of the contaminant remains in the inventory of a repository, how much is adsorbed onto the soil or rock matrix, and how much reaches the water table. Effective use of TOSPAC requires knowledge in a number of diverse disciplines, including real groundwater flow and transport, the mathematical models of groundwater flow and transport, real-world data required for the models, and the numerical solution of differential equations. Equally important is a realization of the limitations intrinsic to a computer model of complex physical phenomena. This User's Guide not only describes the mechanics of executing TOSPAC on a computer, but also examines these other topics.

30718 (SAND–91-1956) **Small-scale brine inflow experiments: Data report through June 6, 1991.** Finley, S.J. (Sandia National Labs., Albuquerque, NM (United States)); Hanson, D.J.; Parsons, R. Sandia National Labs., Albuquerque, NM (United States). Apr 1992. 178p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92017355. Source: OSTI; NTIS; INIS; GPO Dep.

Seventeen small-scale brine inflow experiment boreholes have been and are currently being monitored for brine accumulation. All of the boreholes were drilled from underground excavations at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, NM. Experiments are ongoing in Room D, Room L4, and the Q access drift in the WIPP underground. The boreholes range from approximately 5 to 90 cm in diameter and from 3 to 6 m in length. The objective of these experiments is to provide data for use in the development and validation of a predictive, mechanistic model for brine inflow to the repository. There is considerable variability in the observed responses of the different boreholes, and there are also significant similarities. Two of the boreholes in Room D have yielded no brine in more than 3.5 years, while all 15 of the other boreholes have produced anywhere from 2 to 90 kg of brine. Inflow rates vary by as much as 2 orders of magnitude for boreholes of the same dimensions in the same general location; however, inflow rates measured in most of the boreholes are of the same order of magnitude. Decreasing, increasing, and steady inflow rates have been measured. Nevertheless, 9 of the 15 brine-producing boreholes behaved similarly early in their history. These 9 boreholes all exhibited a relatively high initial inflow rate followed by a fairly smooth decline with time. Variabilities in borehole response can be explained by assuming there are heterogeneities in the formation tested. In most cases these heterogeneities are believed to be excavation-induced. Data from these experiments suggest that flow near excavations has been altered by rock deformation, including fracturing. Additional experiments are required to differentiate between a far-field, near-field, or combination brine source and to characterize the significant flow mechanism or mechanisms.

30719 (SAND–91-2795) **TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project.** Barnard, R.W. (Sandia National Labs., Albuquerque, NM (United States)); Wilson, M.L.; Dockery, H.A.; Kaplan, P.G.; Eaton, R.R.; Bingham, F.W.; Gauthier, J.H.; Robey, T.H. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 376p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019642. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes an assessment of the long-term performance of a repository system that contains deeply buried highly radioactive waste; the system is assumed to be located at the potential site at Yucca Mountain, Nevada. The study includes an identification of features, events, and processes that might affect the potential repository, a construction of scenarios based on this identification, a selection of models describing these scenarios (including abstraction of appropriate models from detailed models), a selection of probability distributions for the parameters in the models, a stochastic calculation of radionuclide releases for the scenarios, and a derivation of complementary cumulative distribution functions (CCDFs) for the releases. Releases and CCDFs are calculated for four categories of scenarios: aqueous flow (modeling primarily the existing conditions at the site, with allowances for climate change), gaseous flow, basaltic igneous activity, and human intrusion. The study shows that models of complex processes can be abstracted into more simplified representations that preserve the understanding of the processes and produce results consistent with those of more complex models.

30720 (SAND–91-2924C) **Steady-state saturation profiles for linear immiscible fluid displacement in porous media.** Webb, S.W. Sandia National Labs., Albuquerque, NM (United States). [1991]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921110–16: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92018827. Source: OSTI; NTIS; INIS; GPO Dep.

Relationships for steady-state saturation profiles have been derived for linear immiscible displacement in a uniform porous media including relative permeability and capillary pressure effects. These profiles are of constant shape and translate in the porous media with time. The shape of these profiles has been determined for the injection of a nonwetting (wetting) fluid into a porous media initially saturated with a wetting (nonwetting) fluid. The effect of different two-phase characteristic curves including Brooks and Corey, Parker et al., and the Sandia Functions has been evaluated.

30721 (SAND--91-7070) **Swelling pressure, water uptake, and permeability of 70/30 crushed salt/bentonite.** Pfeifle, T.W. (RE/SPEC, Inc., Rapid City, SD (United States)); Brodsky, N.S. Sandia National Labs., Albuquerque, NM (United States). Sep 1991. 71p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92040647. Source: OSTI; NTIS; INIS; GPO Dep.

Two experiments were conducted on specimens consisting of 70 percent by dry weight crushed salt and 30 percent by dry weight bentonite. The experiments included fifteen tests and were designed to measure the swell pressures induced by the introduction of saturated Brine A, a high magnesium-content brine, and to measure permeability. Specimens of three dry densities were used: 1600 $kg{\cdot}m^{-3}$, 1800 $kg{\cdot}m^{-3}$, and 2100 $kg{\cdot}m^{-3}$. Experiments were conducted in an oedometer which is a stiff pressure vessel designed to maintain specimens at constant volume. Test durations ranged from 3 to 112 days. When specimens were put into contact with brine, their swelling was inhibited by the oedometer, and the pressures that were required to restrict swelling were recorded. Permeability measurements were made on specimens with densities of 1600 $kg{\cdot}m^{-3}$ and 1800 $kg{\cdot}M^{-3}$ using the constant hydraulic head, steady-state flow method. Flow was neverestablished for the 2100 $kg{\cdot}m^{-3}$ specimens. Including recent data, permeability changed approximately two orders of magnitude (from $1 \times 10^{-15} m^2$ to $1 \times 10^{-17} m^2$) as density increased from 1600 $kg{\cdot}m^{-3}$ to 1950 $kg{\cdot}m^{-3}$. Moisture content and distribution measurements were made on all specimens post-test. On the average, all specimens reached saturation; however, moisture content distributions were nonuniform in many specimens.

30722 (SAND--92-1226C) **Approach to geologic repository post closure system performance assessment.** Pahwa, S.B.; Felton, W.; Duguid, J.O. Sandia National Labs., Albuquerque, NM (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920606--31: American Nuclear Society annual meeting, Boston, MA (United States), 7-12 Jun 1992). Order Number DE92017043. Source: OSTI; NTIS; INIS; GPO Dep.

An essential part of the license application for a geologic repository will be the demonstration of compliance with the standards set by the Environmental Protection Agency. The performance assessments that produce the demonstration must rely on models of various levels of detail. The most detailed of these models are needed for understanding thoroughly the complex physical and chemical processes affecting the behavior of the system. For studying the behavior of major components of the system, less detailed models are often useful. For predicting the behavior of the total system, models of a third kind may be needed. These models must cover all the important processes that contribute to the behavior of the system, because they must estimate the behavior under all significant conditions for 10,000 years. In addition, however, computer codes that embody these models must calculate very rapidly because of the EPA standard's requirement for probabilistic estimates, which will be produced by sampling thousands of times from probability distributions of parameters. For this reason, the total-system models must be less complex than the detailed-process and subsystem models. The total-system performance is evaluated through modeling of the following components: Radionuclide release from the engineered-barrier system. Fluid flow in the geologic units. Radionuclide transport to the accessible environment. Radionuclide release to the accessible environment and dose to man.

30723 (SKB-TR--91-59) **Proceedings from the technical workshop on near-field performance assessment for high-level waste.** Sellin, P. (SKB, Stockholm (Sweden)); Apted, M.; Gago, J. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 190p. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). Order Number DE92644559. Source: OSTI; NTIS; INIS.

This report contains the proceedings of 'Technical workshop of near-field performance assessment for high-level waste' held in Madrid October 15-17, 1990. It includes the invited presentations and summaries of the scientific discussions. The workshop covered several topics: * post-emplacement environment, * benchmarking of computer codes, * glass release, * spent-fuel release, * radionuclide solubility, * near-field transport processes, * coupled processes in the near-field, * integrated assessments, * sensitivity analyses and validation. There was an invited presentation on each topic followed by an extensive discussion. One of the points highlighted in the closing discussion of the workshop was the need for international cooperation in the field of near-field performance assessment. The general opinion was that this was best achieved in smaller groups discussing specific questions. (au) Separate abstracts were prepared for 9 papers in this volume.

30724 (SKB-TR--91-59, pp. 11-22) **Performance assessment perspectives with reference to the proposed repository at Yucca Mountain, Nevada.** Murphy, W.M. (Center for Nuclear Waste Regulatory Analyses, San Antonio, TX (USA)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

The near-field environment of geologic repositories for high-level nuclear waste (HLW) encompasses the interface between engineered waste containment structures and the geologic surroundings. Near-field fluxes of heat and mass, fields of radiation and stress and the effects of these fluxes and fields on the physical and chemical characteristics of the system are critical to the performance of the geologic repository. The relations among transient and heterogeneous thermal, hydrologic, physical, chemical and radiologic phenomena over the large time and space scales of a geologic repository are incompletely understood. Simplified mathematical and statistical models, which are generally required in present-day performance assessments of HLW systems, can not be expected to represent the complex interactions in detail. These models are justified in part on the basis of conservatism in assumptions and parameters and sensitivity and uncertainty analyses. They must also be supported by comparisons with more detailed theoretical and experimental analyses that are capable of identifying and quantifying significant synergistic effects and assessing the conservatism of the simpler models. The purpose of this paper is to review the general physical and chemical features of the HLW near-field environment. Examples are drawn from selected theoretical, experimental and field analyses of thermal, hydrological, mechanical and chemical phenomena relevant to performance assessments of the proposed repository at Yucca Mountain, Nevada, USA. The consequences of the environmental characteristics for waste isolation and their significance for performance assessments are the focus of other contributions to this volume and will be addressed only generally in this paper. (au) (41 refs.).

30725 (SKB-TR--91-59, pp. 25-48) **What do we know about nuclear waste glass performance in the repository near field?.** Grambow, B. (Kernforschungszentrum Karlsruhe GmbH, (Germany)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

Borosilicate glass waste forms will contain about 99% of the highly radioactive isotopes extracted by reprocessing from spent nuclear fuel. The glass phase provides stability for intermediate storage and transport. During geological disposal the glass waste form is one of many barriers against possibly harmful radionuclide release to the biosphere. In order to assess the long-term ability of vitrified waste forms to immobilize radionuclides the corrosion mechanism and the effect of other near field components (steel container, overpack, backfill, host rock etc.) were studied by large experimental programs. Modeling has been identified as a key for using experimental results for predicting the glass future behavior. Incessant interplay between pre- or postdictions and correction of the models by experimental data is a chief characteristic in modeling. Confidence in modeling results can only grow if models represent a major fraction of experimental data and experience, both conceptually and quantitatively. Nevertheless, agreement of model and experiment is not sufficient in the context of long-term predictions, because the problem of scaling from experimental to geologic time frames remains unsolved. This gap can only be closed by reference to natural analogue systems. In the following the current status in understanding and modeling of glass corrosion is briefly reviewed. Despite the general interest in radionuclide release data, the paper is focused on the corrosion kinetics of the glass phase because (1) glass corrosion has a major impacts on the overall solution chemistry in the near field and, hence, indirectly also on radionuclide solubility limits and (2) the glass phase dissolution data are a direct measure for the release of soluble nuclides. (au) (58 refs.).

30726 (SKB-TR--91-59, pp. 51-65) **Source term models for the release of radionuclides from used nuclear fuel.** Garisto, F. (AECL Research, Witheshell Laboratories, Pinawa, Manitoba (Canada)); Garisto, N.C. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--; Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

The environmental and safety assessment of used nuclear fuel disposal in an underground vault requires information concerning the rates at which radionuclides will be released from the fuel elements after groundwater breaches the fuel cladding and contacts the fuel. This information is provided by the source term model. Experimental studies on used-fuel dissolution have shown that the release of radionuclides from used fuel depends largely on the location of the radionuclides within the fuel element. Three main release mechanisms, which operate on different time scales, have been identified. First, there is the rapid release of soluble fission products from the fuel/cladding gap as soon as groundwater penetrates the fuel cladding. Second, there is the leaching of fission products from the fuel grain boundaries. Third, there is the very slow release of radionuclides from the fuel matrix due to the dissolution of the UO_2 grains. The dissolution of the fuel controls the release of the major fraction of the radionuclide inventory. The source term model describing radionuclide releases from used fuel should represent all three release mechanisms. In mathematical terms, such a model defines the boundary conditions at the fuel/buffer interface needed to solve the mass transport equations describing the migration of radionuclides away from the fuel/groundwater interface, through the engineered barriers (e.g., clay buffer) and into the host rock. The source term model used in the Canadian Nuclear Fuel Waste Management Program (CWMP) consists of three components: 1. an instant-release model, representing both the gap and grain-boundary releases; 2. a long-term release model, representing the congruent release of radionuclides due to dissolution of the fuel grains; and 3. a model for the release of activation products from the Zircaloy cladding. The objective of this paper is to describe the radionuclide source term model used in the CWMP. (au) (29 refs.).

30727 (SKB-TR--91-59, pp. 67-75) **Solubility and speciation studies for nuclear repository performance assessment.** Nitsche, H. (Lawrence Berkeley Laboratory, Berkeley, CA (USA)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

Solubility and speciation data are important in understanding aqueous radionuclide transport through the geosphere. They define the source term for transport retardation processes such as sorption and colloid formation. Solubility and speciation data are useful in verifying the validity of geochemical codes that are part of predictive transport models. Radionuclide solubility studies in groundwaters from a repository region will provide limits on radionuclide concentrations in these waters. Meaningful thermodynamically defined solubility studies must satisfy four criteria: (1) solution equilibrium conditions, (2) effective and complete phase separation, (3) a well-defined solid phase, and (4) knowledge of the speciation/oxidation state of the soluble species at equilibrium. Results from solubility and speciation experiments of $^{237}NpO^{+}{}_{2}$,$^{239}Pu^{4+}$, and $^{241}Am^{3+}/Nd^{3+}$ in J-13 groundwater (from the Yucca Mountain region, Nevada, which is being investigated as a potential high-level nuclear waste disposal site) at three different temperatures (25 degrees, 60 degrees, and 90 degrees C) and pH values (6,7, and 8.5) are presented. (au) (3 refs., 3 figs.).

30728 (SKB-TR--91-59, pp. 79-89) **Near field transport processes.** Neretnieks, I. (Royal Institute of Technology, Dept. of Chemical Engineering, Stockholm (Sweden)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

In repositories for nuclear waste there are many processes which will be instrumental in corroding the canisters and releasing the nuclides. Based on experiences from studies on the performance of repositories and on an actual design the major mechanisms influencing the integrity and performance of a repository are described and discussed. The paper addresses only conditions in crystalline rock repositories. The low water flow rate in fractures and channels plays a dominant role in limiting the interaction between water and waste. Molecular diffusion in the backfill and rock matrix as well as in the mobile water is an important transport process but actually limits the exchange rate because diffusive transport is slow. Solubility limits of both waste matrix and of individual nuclides are also important. Complicating processes include gas generation by iron corrosion and alpha-radiolysis. (au) (19 refs., 2 figs.).

30729 (SKB-TR--91-59, pp. 91-107) **Coupled processes in the near-field.** Jamet, P. (Ecole des Mines de Paris, Fontainebleau, Cedex (France). Centre d'Informatique Geologique); Fargue, D.; Marsily de, G.D. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

Underground radioactive waste disposal sites constitute systems of extreme complexity because they are the scene of a great number of physical and chemical phenomena, that have to be included in the safety assessment, and have numerous effects both on the solid confining media (natural and engineered barriers) and on the fluid phase as well as being mutually interactive. They are difficult to quantify because of the lack of field and laboratory data. Although in recent years the tendency in model development has been to treat the phenomena conceptually rather than using the black box' approach, this has oriented the research more toward complicating the basic transport equations (advective-dispersive equation, Darcy's equation) than toward a comprehensive study which would lead to a complete, original and rigorous treatment of the problem as a whole. We are therefore, at present, very far from a unification of the tremendous amount of existing studies which, at the moment, is limited to simply collecting and combining them, more or less successfully (but, at any rate, very empirically). In view of this situation, there is no way of avoiding a review listing the main research fields currently under investigation and the various models to which these investigations have given rise. However, and in the spirit of this workshop, whose aim is to collate these studies, which although they have a common objective are widely scattered, we will present the method which we think is best suited to a rational and exhaustive study of systems with multiple field, potentials and flows, in particular the near field. In doing so, we are encouraged by the increasing number of studies in the same spirit and although this approach seems, at the moment, to belong to a more distant future in model development, we will give a specific example of a case where it can be used with success. (au) (24 refs., 4 figs.).

30730 (SKB-TR--91-59, pp. 111-129) **Integrated near-field assessment.** McKinley, I.G. (Nagra, Baden (Switzerland)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

In an effort to ensure conservatism, performance assessment model generally treat the near field in a rather simplistic manner - often ignoring the reactions between various barriers and, indeed, the existence of particular barriers entirely. This paper present an alternative approach in which the near field is evaluated in an integrated manner which is intended to be as realistic as possible. Such an approach, when applied to the current Swiss HLW near-field design, predicts that no significant releases will occur and that, as performance is provided predominantly by massive geochemical buffers, the analysis is very robust. (au) (26 refs., 3 figs., 3 tabs.).

30731 (SKB-TR--91-59, pp. 133-152) **Sensitivity analysis and validation.** Umeki, H. (Power Reactor and Nuclear Fuel Development Corporation, Akasaka, Minato-ku (Japan)); Masuda, S. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

In the field of performance assessment modelling for high-level radioactive waste disposal in geologic repositories, evaluating model uncertainties is a key factor in estimating radionuclide transport rate and extrapolating thousands of years into the future. Sensitivity and uncertainty analysis is performed to determine the relationships among the input and output variables of a mathematical model through numerical methods. Because post-closure performance assessment relies heavily on models, sensitivity and uncertainty analyses will become an integral part of the model evaluation and validation process. Model validation is also needed to establish the credibility of predictions to the technical community, and to achieve grater public confidence in the long-term safety of a geologic repository. In this paper, the role of sensitivity analysis as a part of near-field performance assessment will be discussed in terms of model validation. A description of the ENTRY (the Engineered Scale Test and Research Facility) project for validation study will also be presented. (au) (17 refs., 5 figs.).

30732 (SKB-TR--91-59, pp. 155-164) **Testing near-field models for deep disposal.** Grogan, H.A. (INTERA-ECL, Oxon (United Kingdom)); Worgan, K.J. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. (CONF-9010497--: Technical workshop on near field performance assessment for high-level waste, Madrid (Spain), 15-17 Oct 1990). In *Proceedings from the technical workshop on near-field performance assessment for high-level waste.* 190p. Order Number DE92644559. Source: OSTI; NTIS; INIS.

The near field of a deep radioactive waste repository is a complex environment whose spatial and temporal evolution is determined by many different physical and chemical processes. For near-field performance assessment modelling, this system has to be simplified whilst ensuring that the key processes determining radionuclide release and transport are accounted for. This paper discusses the various types of near-field models developed and the strategies that can be employed to test them. Model testing within an international framework is seen as an important step towards establishing the credibility of current near-field performance assessment codes. The considerable benefits to be gained from organising such an exercise are highlighted drawing upon experience from similar activities in other fields. (au) (15 refs.).

30733 (STRIPA-TR--91-30) **Final report of the rock sealing project - Sealing properties and longevity of smectitic clay grouts.** Pusch, R. (Clay Technology AB, Lund (Sweden)); Karnland, O.; Hoekmark, H.; Sanden, T.; Boergesson, L. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 198p. Order Number DE92644569. Source: OSTI; NTIS; INIS.

Na and Ca bentonite clay grouts with densities that make them easily injected into fine fractures have been hydrothermally treated and investigated with respect to the hydraulic conductivity and shear strength. Exposure of the grouts to salt groundwater increased the hydraulic conductivity up to around 10^{-5} m/s, which is on the same order of magnitude as the value at complete conversion of soft montmorillonite clay to hydrous mica, i.e. the major ultimate reaction product. Still, even this 'worst scenario' case will not lead to a higher bulk conductivity of the grouted rock than around 10^{-10} m/s of rock with a conductivity of 10^{-8} m/s before grouting. The rate of such conversion, which is entirely dependent on the potassium content of the groundwater, can be anything from a few hundred years to several thousand years depending primarily on the magnitude of prevailing hydraulic gradients. The shear strength of the grouts, which determines the resistance to piping and erosion, increases with time and temperature. The most critical situation is immediately after injection into the rock, when hydraulic gradients exceeding about 30 may produce piping. (au).

30734 (UCRL-ID--111021) **Preliminary feasibility and cost analysis of the in-situ microbial filter concept.** Wijensinghe, A.M.; Knapp, R.B.; Taylor, R.T.; Carman, L.M. Lawrence Livermore National Lab., CA (United States). 20 Mar 1992. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92018662. Source: OSTI; NTIS; INIS; GPO Dep.

In this report the cost of installing and operating an in-situ microbial filter to remediate a site at which the groundwater is contaminated by TCE is estimated and compared against the cost of remediation by a standard pump and treat method. In this microbial filter method, relatively thin vertical filters are installed in the subsurface to intercept contaminant plumes that are being transported by the flowing groundwater. The filters are created by injecting into the subsurface methanotrophic microbes grown in surface bioreactors and allowing them to become attached to the soil. The microbes produce an enzyme (MMO) that fortuitously catalyzes the degradation of TCE into carbon dioxide, water and chloride ions. Because no external energy or carbon source is provided, the microbes remain metabolically active only for a limited time so that the filter needs to be periodically replenished with fresh microbes. Two methods of establishing and maintaining the microbial filter using either vertical or horizontal wells were studied. In the pump and treat method considered for comparison, the groundwater pumped to the surface is first subjected to air-stripping of the liquid-phase volatile organic compound (i.e., VOC) from the groundwater followed by adsorption of the heated vapor-phase VOC by granular activated carbon (i.e., GAC) within a packed-bed filter.

30735 (UCRL-ID--111352) **Evaluation of actinide volatilities in mixed waste processors.** Krikorian, O.H.; Condit, R.H.; Ebbinghaus, B.B.; Fontes, A.F.; Fleming, D.L.; Hoenig, D.L.; Otto, R.A.; Magana, J.W.; Morris, W.F. Lawrence Livermore National Lab., CA (United States). 24 Aug 1992. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92041044. Source: OSTI; NTIS; INIS; GPO Dep.

This report is an interim status report on a study of uranium, plutonium and americium volatilities in mixed waste oxidation processors. Both thermodynamic modeling methods and experimental measurements (incinerator ashes) are being used to assess the actinide volatilities. The volatile species of greatest importance is expected to be the actinide oxyhydroxide, $MO_2(OH)_2(g)$. Based on early measurements, the volatility of $PuO_2(OH)_2(g)$ from $PuO_2(s)$ in the presence of 0.9 atm O_2 and 0.1 atm H_2O at 1330 K is found to be about 4×10^{-10} atm.

30736 (UCRL-JC--109563) **Electrodialysis and electrohydrolysis applied to Hanford single tank wastes.** Hickman, R.G.

Lawrence Livermore National Lab., CA (United States). Apr 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920851-67: Spectrum '92: nuclear and hazardous waste management international topical meeting, Boise, ID (United States), 23-27 Aug 1992). Order Number DE92019506. Source: OSTI; NTIS; INIS; GPO Dep.

There are many waste salts stored within the DOE complex but the most common is sodium nitrate and it is difficult to immobilize for final disposal. This salt can be split into useful products, particularly nitric acid using either of two electrochemical membrane processes. The process utilizing bipolar electrohydrolysis membrane technology is described briefly, along with how it might fit into a process flow sheet.

30737 (UCRL-JC-109653) **A system for destroying mixed and hazardous wastes with no gas or liquid effluents.** Camp, D.W.; Upadhye, R.S. Lawrence Livermore National Lab., CA (United States). Apr 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920851-68: Spectrum '92: nuclear and hazardous waste management international topical meeting, Boise, ID (United States), 23-27 Aug 1992). Order Number DE92019541. Source: OSTI; NTIS; INIS; GPO Dep.

We developed a conceptual design for a processing system in which the organic components of hazardous or mixed waste would be destroyed, while discharging virtually no gaseous or liquid effluents. Only solid products would be produced. For mixed waste feeds these could then be transported and disposed as low level waste. This system would oxidize the organics using any one of several destruction processes adapted to replace air with a mixture of O_2 and recycled CO_2. Net production Of CO_2, HC1, and H_2O in the dosed recycle system would be scrubbed or reacted to solid products such as $CaCO_3$, NaCl, and concrete. This no-effluent design may improve community acceptance of a waste destruction system.

30738 (UCRL-JC-109993) **Total destruction of organic compounds in aqueous wastes by a UV/H_2O_2 process.** Wang, F.; Ng, E.; Lum, B.; Cassidy, K. Lawrence Livermore National Lab., CA (United States). Apr 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48 ;AC34-90DP62349. (CONF-920851-69: Spectrum '92: nuclear and hazardous waste management international topical meeting, Boise, ID (United States), 23-27 Aug 1992). Order Number DE92019540. Source: OSTI; NTIS; GPO Dep.

For the uv/H_20_2 process, a medium-high pressure mercury lamp is used to destroy dilute concentration of organics in a circulated reactor chamber. Hydrogen peroxide is fed continuously into the chamber. A mixture of ethylene glycol with water was treated by the process and the organic parts were totally oxidized (i.e., all carbons were converted to $C0_2$ and hydrogens were converted to H_20) without difficulty. In treating Trimsol, a water miscible cutting oil, both the Trimsol and hydrogen peroxide were fed continuously and the organic compounds were also totally oxidized, but the rate of Trimsol destruction is low. The pH values during the process must be greater than 6 to prevent phase separation.

30739 (WHC-EP-0399-Rev.2) **Fiscal year 1992 program plan for evaluation of ferrocyanide in the Hanford Site waste tanks: Revision 2.** Cash, R.J.; Dukelow, G.T. Westinghouse Hanford Co., Richland, WA (United States). Jul 1992. 113p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92040413. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this document is to provide a description of the fiscal year (FY) 1992 priorities, logic, work breakdown structure (WBS), and task descriptions for the Ferrocyanide Waste Tank Safety Program. The Ferrocyanide Safety Program was established in 1990 to provide resolution of a major safety issue identified for 24 high-level waste tanks at the Hanford Site. Radioactive wastes from defense operations have accumulated at the Hanford Site in underground waste tanks since the early 1940s. During the 1950s, additional tank disposal space was required to support the defense mission. Two procedures were used to obtain this additional volume within a short period of time while minimizing the construction of additional tanks. One procedure involved the use of evaporators to concentrate the waste by removing water. The second procedure involved a process for scavenging radiocesium from tank waste liquids and pumping the resulting liquids to disposal cribs. In implementing this process, approximately 140 metric tons of ferrocyanide were added to wastes that were later routed to 24 single-shell tanks.

30740 (WHC-EP-0514) **Underground storage tank waste characterization needs assessment workshop.** Westinghouse Hanford Co., Richland, WA (United States); Bovay Northwest, Inc., Richland, WA (United States). Jun 1992. 104p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-9106248-: Department of Energy national underground storage tank waste characterization needs assessment workshop, Hanford, WA (United States), 25-27 Jun 1991). Order Number DE92018162. Source: OSTI; NTIS; INIS; GPO Dep.

The National Underground Storage Tank Characterization Needs Assessment Workshop (Tank Waste Characterization Workshop) was convened on June 25–27, 1991 in Richland, Washington. This workshop was held to address the technology development needs for characterizing tank wastes at five US Department of Energy (DOE) sites across the country. These five DOE sites include Hanford, Fernald, the Idaho National Engineering Laboratory, Oak Ridge National Laboratory, and the Savannah River Site.

30741 (WINCO-11562) **Growth kinetics for the precipitation of zirconium hydroxide from aqueous zirconium and tin bearing solutions by the addition of ammonium hydroxide.** Carleson, T.E. (Idaho Univ., Moscow, ID (United States). Dept. of Chemical Engineering); Chipman, N.A. Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States). 11 Sep 1989. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-84ID12435. (CONF-891113-14: American Institute of Chemical Engineers (AIChE) annual meeting, San Francisco, CA (United States), 5-10 Nov 1989). Order Number DE92017480. Source: OSTI; NTIS; INIS; GPO Dep.

The precipitation of zirconium hydroxide from an aqueous solution of ammonium hexafluorozirconate occurs rapidly upon addition of ammonium hydroxide. Experimental data indicate growth and nucleation rates between 0.06 and 0.28 microns/minute and around 10 x 107 number/L-min, respectively. Experiments with a mixed suspension mixed product removal crystallizer for concentrations of reactants of about 0.05 M ammonium hexafluorozirconate precipitating with 0.002 M ammonium hydroxide showed apparent nonlinear growth rates in some cases but not others. Batch studies indicated that growth rate dispersion is probably not present. When the AFL nonlinear model was used to fit the data, the power coefficient obtained was greater than 1, in disagreement with theory. In addition, for some of the data "S" shaped curves of the logarithm of the cumulative number greater than versus size were obtained. These curves can not be fit by the AFL model. A program developed at the University of Arizona was used to simulate the crystallization runs. The program results indicated that some of the nonlinear behavior may be attributed to transient conditions. Experimental data also illustrated this behavior. The effect of trace amounts of tin fluoride (0.008 M) on the nucleation and growth kinetics was also evaluated. For some residence times, the presence of tin resulted in reduced median particle diameters, higher growth rates, and lower number counts.

30742 (WINCO-11730) **Calciner Pilot Plant waste minimization practices at the ICPP.** Brewer, K.N. Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States). 30 Jul 1991. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-84ID12435. Order Number DE92017220. Source: OSTI; NTIS; INIS; GPO Dep.

Westinghouse Idaho Nuclear operates the DOE's Idaho Chemical Processing Plant to recover uranium from spent Navy fuel. The high level radioactive liquid waste generated recovery operations is solidified in a fluidized bed calciner. Two calciner pilot plants at the Idaho Chemicaling plant are used to: (1) produce calcine, (2) develop new chemical flowsheets, and (3) optimize full-scale operations for the calcination of highly radioactive liquid waste at the ICPP's New Waste Calcining Facility (NWCF). As a consequence of the pilot plants operations, non-radioactive solid and liquid waste is ted by the calciner Pilot Plants during their operation. Solid and liquid waste volume data between 1980–1990 have been gathered and evaluated. This data shows that solid hazardous generation volumes have been reduced by 59% and liquid waste (hazardous and non-hazardous) generation volumes have been reduced by an average of 58% over this time period. The improvements are a results of: (1) segregating potentially hazardous contaminated waste as non-hazardous after verification by random sampling (59% reduction), (2) reducing liquid waste at the source and (3) recycling the liquid waste (58% reduction).

30743 (WSRC-MS–92-279) **Phase stability determinations of DWPF waste glasses.** Andrews, M.K.; Cicero, C.A.; Marra, S.L.; Beam, D.C.; Jantzen, C.M. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-9208128–1: 4. symposium on nucleation and crystallization, Stone Mountain, GA (United States), 16-19 Aug 1992). Order Number DE92040169. Source: OSTI; NTIS; INIS; GPO Dep.

The high-level radioactive wastes stored at Savannah River, will be immobilized in borosilicate glass in the Defense Waste Processing Facility (DWPF). Waste Acceptance Preliminary Specifications require that time-temperature-transformation (TTT) curves be provided for expected DWPF compositions, in order to predict the durability of the waste form. In order to derive these TTT curves, samples of simulated glasses are being heat treated and then analyzed. The seven simulated glasses include blend, high aluminum (HM) and high iron (Purex). X-ray diffraction show minimal crystallization for the heat treatments at 400, 1000 and 1100 C; 600 and 700 C produce the greatest amount of crystallization. Scanning electron microscopy show heterogeneous crystallization with the spinel forming on melt insolubles and the acmite nucleating on the spinel. Initial leaching results show that the glass durability decreases with increasing crystallinity for the 700 C glasses. Future plans are outlined. 2 tables, 9 refs. (DLC)

30744 (WSRC-RP–91-1151) **Spray nozzle pattern test for the DWPF HEME task technical plan.** Lee, L. Westinghouse Savannah River Co., Aiken, SC (United States). 15 Nov 1991. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92040047. Source: OSTI; NTIS; INIS; GPO Dep.

The DWPF melter off-gas systems have two High-Efficiency Mist Eliminators (HEME) upstream of the High-Efficiency Particulates Air filters (HEPA) to remove fine droplets and particulates from the off-gas. The HEMEs consist of three filter candles. Each filter candle consists of a 0.5 inch layer of 30 micron diameter glass fiber on the upstream face followed by a 2.5 inch layer of 8-micron-diameter glass fiber packed at 11 lbs per cubic foot. The coarse 30-micron filter serves as a prefilter and extends the life of the HEME filter. To have an acceptable filter life and an efficient HEMIE operation, air atomized water is sprayed into the off-gas stream entering the 14EME and onto the HEMEE surface. The water spray keeps the HEME wet which would dissolve the soluble particulates and enhance the HEME efficiency. A properly designed spray nozzle should wet the three candles of the HEME filter completely.

30745 (Y/ER–16) **Work plan for the preliminary assessment and characterization of dense nonaqueous-phase liquids in the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Oak Ridge Y-12 Plant.** Haase, C.S.; King, H.L. Oak Ridge Y-12 Plant, TN (United States). Jul 1990. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. Order Number DE92019636. Source: OSTI; NTIS; INIS; GPO Dep.

On January 5, 1990, accumulations of dense, nonaqueous-phase liquids (DNAPLs) were discovered at depths of approximately 274 ft below ground surface along the southern border of Burial Ground A-South within the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Y-12 plant. Subsequent to this discovery, a preliminary investigation was conducted to obtain information on the mode of occurrence and distribution of the DNAPLs and to obtain expert technical advice on DNAPL behavior in fractured rock, such as that underlying the Bear Creek Burial Grounds. The investigation included installation and sampling of two additional groundwater monitoring wells, resampling of existing wells in the vicinity of the discovery well, evaluation of existing groundwater quality data, and technical review of available information and site conditions by an independent consultant expert in the behavior of DNAPLs. Results of this investigation are summarized.

30746 (Y/ER–17) **Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee.** Walter, K.A.; White, R.K.; Southworth, G.R.; O'Donnell, F.R.; Travis, C.C.; White, D.A. Oak Ridge National Lab., TN (United States). Dec 1990. 145p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. Order Number DE92019630. Source: OSTI; NTIS; INIS; GPO Dep.

The Oil Landfarm Waste Management Area (WMA) is located in Bear Creek Valley about 1 mile southwest of the Y-12 Plant on the US Department of Energy (DOE) Oak Ridge Reservation. From 1943 until 1982 several types of solid and liquid wastes were deposited in the five disposal areas that constitute the Oil Landfarm WMA. The disposal areas are: the OH Landfarm disposal plots, the Boneyard, the Burnyard, the Chemical Storage Area, and the Sanitary Landfill. The Oil Landfarm disposal plots were used from 1973 until 1982 for the biological degradation of oily wastes.The Boneyard was active 1943 to 1970 and received a great variety of wastes for burning or burial including organics, metals, acids, and debris. The Burnyard operated from 1943 to 1968 and. consisted of unlined trenches in which various wastes from plant operations were ignited with solvents or oils and burned. The Chemical Storage Area operated from 1975 to 1981 for the disposal of wastes that posed safety hazards; for example, reactive, corrosive, and explosive chemicals. The Sanitary Landfill was used from 1968 to 1980 for the burial of solid wastes and may contain toxic chemicals and contaminated material. Since 1982 the Y-12 Plant has sampled groundwater, surface water, soils and sediments in Bear Creek Valley. Data from this sampling program show that at the Oil Landfarm WMA groundwater is the most seriously contaminated medium. The chief contaminants of groundwater are the volatile organic compounds (VOCs). This study assesses the risks to human health and the environment posed by the Oil Landfarm WMA under three remedial scenarios.

30747 (YJT–90-13) **On the world's ice ages and changing environments.** Eronen, M. (Helsinki Univ., Lahti (Finland). Lahti Research and Training Centre); Olander, H. Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Jul 1990. 76p. Order Number DE93602354. Source: OSTI; NTIS; INIS.

All known ice ages during the earth's history are reviewed. The oldest glaciation occurred around 2.3 billion years ago, followed by a series of large glaciations 950-650, 450-430 and 310-270 million years ago. Continental drift played a major role in these long-term climatic changes. The present Quaternary ice age actually began 17 million years ago, when a large ice mass grew over Antarctica. A detailed account is given of the climatic fluctuations during the Quaternary period (over 2.5 million years). Different stratigraphic records, and the relationship of climatic variations to orbital forcing are discussed. Large environmental changes took place in the course of the climate oscillations. Large ice sheets waxed and waned, global sea-levels fluctuated, forests disappeared from many regions during cold times and advanced during favourable times. The ice masses depressed the earth's crust markedly, and this then rose rapidly when the ice melted. The extent of glacial erosion is also discussed. Finally the postglacial climatic history of the earth is described and the consequences of the possible greenhouse effect are considered.(orig.).

30748 (YJT–91-19) **SKB/TVO Ice age scenario.** Ahlbom, K. (Conterra AB, Uppsala (Sweden)); Aeikaes, T.; Ericsson, L. Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Oct 1991. 30p. Order Number DE93602355. Source: OSTI; NTIS; INIS.

Ice ages have repeatedly occurred throughout geological history, and it is likely that they will also occur in the future. The report discusses the principal processes predicted to occur during future glaciations, and which are likely to be of importance for a repository. The report presents a synthesis of the results in a form of a scenario from two state-of-the-art reports, working meetings and a seminar. Based on the present status of knowledge the climate at Scandinavia will gradually become colder permitting the growth of an ice sheet at 5000 years in the mountainous area of Sweden. After a minor warmer period fully stadial conditions will occur around 20 000 years from now, and after interstadial with dry and cold climate again after 60000 years from now. During the latter glaciation ice thickness at Stockholm-Helsinki region is 2500 m. Interstadial conditions similar to the climate of northern Sweden/Finland will prevail after 75000 years from now. The main changes caused by ice sheet are the downwarping/uplift of the crust and changes in the sea level. In addition, changes in groundwater head and flux are foreseen. As a response from climatic changes tundra and permafrost will appear.

30749 (YJT–91-22) **Scenarios for groundwater flow and radionuclide migration of concern for the TVO-92 safety analysis.** Elert, M. (Kematka Consultants Co, Stockholm (Sweden)); Grundfelt, B.; Lindbom, B.; Hautojaervi, A. Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Nov 1991. 35p. Order Number DE93602356. Source: OSTI; NTIS; INIS.

The project aims at formulating different scenarios relevant to performance assessment of radioactive waste repositories in a crystalline rock formation. The scenarios studied range from a repository located in virgin rock to more complex situations with the potential repository located in the rock but being intersected by fracture zones with different inclinations and strikes relative to the prevailing gradient. The project comprises a study of regional flow and migration systems, and also involves discussions on local scale phenomena such as release from the canisters to the near-field barrier, and phenomena related to the disturbed zone around the repository tunnels.

30750 (YJT–91-24) **Deformation stresses and mechanical behaviour of engineered barriers in the repository environment.** Ipatti, A. (Imatran Voima Oy, Vantaa (Finland)); Majamaeki, O. Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Dec 1991. 56p. (In Finnish). Order Number DE93602357. Source: OSTI; NTIS; INIS.

The report surveys functioning of the engineered barriers in the Loviisa repository under deformation stresses of the solidification product and the concrete filling material. The survey is based on the latest estimates of the waste amounts and the corresponding repository plans, and on solidification product compositions and properties. The IVOFEM and NASTRAN software was used in the structural analyses. The materials were supposed to be homogeneous and linearly elastic and dislocations small. Accordingly, the design loads were chosen conservatively so that the impacts of deformation stresses are sufficiently overestimated. A reinforced concrete container lined with cellular plastic remains a watertight structure, meeting the requirements set in view of expansion of a solidification product. In view of the stresses, the decisive time is the intermediate storage stage. The greatest stresses are found in junctions between the container wall and the bottom and cover. The concrete filling between the waste packages cannot resist the drying shrinkage and wetting expansion stresses without cracking. Concrete walls of the repository can withstand the stress caused by wetting expansion of the waste packages only when strongly reinforced. However, the forces against the walls are so big that if cracks in the concrete walls are desired to be restricted, due to reinforcement steel corrosion or wall tightness, the present type of filling material between the waste packages is not necessarily technically the best alternative.

30751 (YJT–92-01) **Redox capacity of crystalline rocks - laboratory studies under 100 bar oxygen gas pressure.** Pirhonen, V. (Technical Research Centre of Finland, Espoo (Finland). Road, Traffic and Geotehnical Lab.); Melamed, A.; Pitkaenen, P.; Isosaari, K. Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Jan 1992. 57p. Order Number DE93602358. Source: OSTI; NTIS; INIS.

The excess amount of dissolved oxygen has been used as a reducible species in order to determine reducing ability (redox capacity) of crystalline rocks and minerals in an aqueous granite solution. Both crushed and whole rock samples were used. The oxygen pressure was set to 100 bar both to promote diffusion and accelerate the surface reactions. The redox capacity was obtained as a function of the decrease of Fe(II) in the solid phase. The decrease of ferrous iron near the reaction surface ranged from about 2 % up to 39 %. All reacted samples showed a decrease of between 5 - 30 % in the ratio of Fel/Fe$_($total) within a reaction zone at the rock surface. The reaction depth varied from about 0.1 cm up to more than 2.5 cm in rocks that were artificially ruptured and in naturally fractured granitic rocks, respectively. The redox capacity calculated from the average decrease of iron in profile varied from about 18 to 620 mol$_F$ell/m^3 and 320 to 580 mol$_F$ell/m^3 for the ruptured and the natural fracture samples, respectively.(orig.).

30752 (YJT–92-02) **Ground water chemistry and water-rock interaction at Olkiluoto.** Pitkaenen, P. (Technical Research Centre of Finland, Espoo (Finland). Road, Traffic and Geotechnical Lab.); Front, K.; Leino-Forsman, H.; Snellman, M. Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Feb 1992. 97p. Order Number DE93602359. Source: OSTI; NTIS; INIS.

Bedrock investigations for the final repository for low- and intermediate level wastes (VLJ repository) generated at the Olkiluoto (TVO-I and TVO-II) nuclear power plant, stareted in 1980. Since 1988 the area has been investigated for the final disposal of spent nuclear fuel. In the report the geochemistry at the nuclear waste investigation site, Olkiluoto, is evaluated. The hydrogeological data are collected from boreholes drilled down to 1000-m depth into Proterozoic crystalline bedrock. The interpretation is based on groundwater chemistry and isotope data, mineralogical data, and the structure and hydrology of the bedrock, using correlation diagrams and thermodynamic calculations (PHREEQE). The hydrogeochemistry and major processes controlling the groundwater chemistry are discussed. The groundwater types are characterized by water-rock interaction but they also show features of other origins. The fresh and brackish waters are contaminated by varying amounts of young meteoric water and brackish seawater. The saline water contains residues of possibly ancient hydrothermal waters, imprints of which are occasionally seen in the rock itself. Different mixing phenomenas are indicated by the isotope contents (O-l8/H-2, H-3) and the Ca/Cl, Na/Cl, HCO_3/Cl, SO_4/Cl, Br/Cl, SI(calcite)/SI(dolomite) ratios. The interaction between bedrock and groundwater is reflected by the behaviour of pH, Eh, Ca, Mg, Na, K, Fe, HCO_3 and $S0_4$. Dissolution and precipitation of calcite and pyrite, and aluminosilicate hydrolysis play the major role in defining the groundwater composition of the above components.

30753 (Y/Sub–92-99928C/2) **Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117.** Bohrman, D.E. (Oak Ridge Y-12 Plant, TN (United States)); Ingram, E.M. Oak Ridge Y-12 Plant, TN (United States); Science Applications International Corp., Oak Ridge, TN (United States). Jun 1992. 626p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. Order Number DE92019408. Source: OSTI; NTIS; INIS; GPO Dep.

This document represents the Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U,and 2075-U, previously located at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee. This document presents a comprehensive summary of all environmental assessment investigations conducted at the East End Fuel Station and the corrective action measures proposed for remediation of subsurface petroleum product contamination identified at the facility.

30754 (Y/WM–123) **Pilot- and field-scale uranium lysimeter studies at the Oak Ridge Y-12 Plant.** Gates, D.D. (Oak Ridge National Lab., TN (United States)); Francis, C.W.; Laster, L.M.; Kimmitt, R.R. Oak Ridge Y-12 Plant, TN (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. (CONF-921101–1: Material Research Society fall meeting, Boston, MA (United States), 30 Nov - 5 dec 1992). Order Number DE92018245. Source: OSTI; NTIS; INIS; GPO Dep.

The Oak Ridge Y-12 Plant initiated the Uranium Lysimeter Demonstration Project in 1988 as a critical component in the development of new disposal facilities for solid low-level waste (LLW) generated at the Plant. Data collected over a long period of time (in excess of 20 years) relevant to the disposal concerns of the

Y-12 Plant are not currently available. The research activities associated with this project were designed to provide comprehensive data on the fate of depleted uranium disposed of in landfills and burial trenches over long periods of time (up to five years). Of particular interest is determining the radiological and chemical characteristics of collected Y-12 waste streams and their respective leachates under field conditions. The data collected during those studies will be used in the preparation and validation of pathways models currently being developed to calculate the radiological dose and chemical toxicity to man resulting from LLW disposal. It is also anticipated that the results of this research will be usedto meet regulatory requirements for siting and permitting future on-site LLW disposal facilities. The project objectives will be met by construction, loading and operation of field leaching facilities (lysimeters) and the completion of several pilot-scale studies.

0530 Environmental Aspects

Refer also to citation(s) 30658, 30660, 30687, 30703, 30964, 31692, 31737, 31745, 31752, 32008

30755 (HW–7405) **H.I. report on the 200 Areas and associated laboratories for the week ending August 27, 1947.** Patterson, C.M. Hanford Works, Richland, WA (United States). 28 Aug 1947. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92018828. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Short communication. HANFORD RESERVATION/radiation monitoring; CONTAMINATION; PRODUCTION REACTORS; SAMPLING; AIR QUALITY; FISSION PRODUCTS; LABORATORIES; RADIOACTIVE WASTES; OCCUPATIONAL EXPOSURE; RADIATION DOSES; RADIOACTIVE WASTE DISPOSAL

30756 (SKB-TR–91-07) **Description of hydrogeological data in SKB's database GEOTAB. Version 2.** Gerlach, M. (ed.) (Mark Radon Miljoe MRM Konsult AB, Luleaa (Sweden)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 185p. Order Number DE92644658. Source: OSTI; NTIS; INIS.

During the research and development program performed by SKB for the final disposal of spent nuclear fuel, a large quantity of geoscientific data was collected. Most of this data was stored in a database called GEOTAB. The data is organized into eight groups (subjects) as follows: - Background information. - Geological data. - Borehole geophysical measurements. - Ground surface geophysical measurements. - Hydrogeological and meteorological data. - Hydrochemical data. - Petrophysical measurements. - Tracer tests. Except for the case of borehole geophysical data, ground surface geophysical data and petrophysical data, described in the same report, the data in each group is described in a separate SKB report. The present report described data within the hydrogeological data group. The hydrogeological data groups (subject), called HYDRO, is divided into several subgroups (methods). BHEQUIPE: equipments in borehole. CONDINT: electrical conductivity in pumped water. FLOWMETE: flowmeter tests. GRWB: groundwater level registrations in boreholes. HUFZ: hydraulic unit fracture zones. HURM: hydraulic unit rock mass. HYCHEM: hydraulic test during chemical Sampling. INTER: interference tests. METEOR: meteorological and hydrological measurements. PIEZO: piezometric measurements at depths in boreholes. RECTES: recovery tests. ROCKRM: hydraulic unit rock types in the rock mass. SFHEAD: single hole falling head test. SHBUP: single hole build up test. SHSINJ: single hole steady state tests. SHTINJ: single hole transient injection tests. SHTOLD: single hole transient injections tests - old data. A method consists of one or several data tables. In each chapter a method and its data tables are described. (au).

30757 (WHC-EP–0541) **Plutonium finishing plant comparison with 40 CFR 61, subpart H, and other referenced guidelines for stack 291-Z-1.** Kristofzski, J.G. (Westinghouse Hanford Co., Richland, WA (United States)); Dasgupta, A.K.; Diediker, L.P.; Clark, M.L. Westinghouse Hanford Co., Richland, WA (United States). Mar 1992. 60p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92019694. Source: OSTI; NTIS; INIS; GPO Dep.

Contained in this report are: (1) 40 CFR 61, subpart H, National Emission Standards for emissions of radionuclides other than radon from US DOE facilities; (2) 40 CFR 60, reference method 2, determination of stack gas velocity and volumetric flow rate (type S pitot tube); (3) 40 CFR, reference method 1, sample and velocity traverses for stationary sources; (4) INS N13.1-1969, guide to sampling airborne radioactive materials in nuclear facilities 4.2.1.2; and (5) method 114, comparison for stack 291-z-1. (GHH)

0540 Health and Safety

Refer also to citation(s) 30642, 30646, 30647, 30649, 30658, 30674, 30675, 30712, 30716, 30988, 31027, 31051, 31057, 31362, 31692, 31699, 31993, 32002, 32008, 32488

30758 (DOE/EH–0257P) **Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act Section 120(e)(5): Annual report to Congress for Fiscal Year 1991.** USDOE, Washington, DC (United States). May 1992. 120p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019091. Source: OSTI; NTIS; INIS; GPO Dep.

The US Department of Energy (DOE) is committed to conducting its operations. In a safe and environmentally sound manner. High priorities for the Department are identifying and correcting environmental problems at DOE facilities that resulted from past operations, and preventing environmental problems from occurring during present and future operations. In this regard, the Department is committed to the 30-year goal of cleanup of all facilities by the year 2019. DOE has issued an Order and guidance establishing policy and procedures for activities conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and has developed a Five-Year Plan, updated annually, that integrates planing for corrective activities, environmental restoration, and waste management operations at its facilities. During Calendar Year 1991 and early 1992, DOE made significant progress in reaching agreements with regulatory entities, undertaking cleanup actions, and initiating preventive measures designed to eliminate future environmental problems. These accomplishments are described.

30759 (EGG-SSRE–9300) **Risk assessment handbook.** Farmer, F.G.; Jones, J.L.; Hunt, R.N.; Roush, M.L.; Wierman, T.E. EG and G Idaho, Inc., Idaho Falls, ID (United States). Sep 1990. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92018040. Source: OSTI; NTIS; INIS; GPO Dep.

The Probabilistic Risk Assessment Unit at EG&G Idaho has developed this handbook to provide guidance to a facility manager exploring the potential benefit to be gained by performance of a risk assessment properly scoped to meet local needs. This document is designed to help the manager control the resources expended commensurate with the risks being managed and to assure that the products can be used programmatically to support future needs in order to derive maximum benefit from the resources expended. We present a logical and functional mapping scheme between several discrete phases of project definition to ensure that a potential customer, working with an analyst, is able to define the areas of interest and that appropriate methods are employed in the analysis. In addition the handbook is written to provide a high-level perspective for the analyst. Previously, the needed information was either scattered or existed only in the minds of experienced analysts. By compiling this information and exploring the breadth of knowledge which exists within the members of the PRA Unit, the functional relationships between the customers' needs and the product have been established.

30760 (LA-UR–92-2332) **A miniature modular multichannel analyzer system for automated, low- resolution gamma-ray spectroscopy.** Sprinkle, J.K. Jr. (Los Alamos National Lab., NM (United States)); Halbig, J.K.; Klosterbuer, S.F.; Russo, P.A.; Smith, S.E. Los Alamos National Lab., NM (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE

Contract W-7405-ENG-36. (CONF-9207102--44: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92018919. Source: OSTI; NTIS; INIS; GPO Dep.

Throughout the nuclear complex, the demand for measurements of nuclear materials holdup is increasing. Plant-wide campaigns to quantify holdup in ventilation ducts and holdup measurements in support of duct remediation are in progress at most DOE sites. Plans to satisfy more stringent requirements for holdup measurements are being developed. Facility decommissioning that accompanies downsizing the complex will require extensive holdup measurement efforts. In the early phases of planning for the modern complex, holdup measurements for new facilities are being specified at the facility design stage. Beyond the DOE, international inspection activities are relying, increasingly, on holdup measurements for verification. Developments in nondestructive assay technologies in the past decade have provided some support for measurements of this Mx. The user's requirements of ruggedness and reliability have been satisfied with compact gamma-ray detectors and spectroscopy instrumentation, but improvements are still needed in simplicity, portability, and speed. Current portable spectroscopy instruments require user sophistication as well as more than one person for transport between measurement locations. However, it is becoming clear that the real measurement need is the simultaneous operation of dozens of units, each by a single relatively unsophisticated user, to perform thousands of measurements per inventory period. The rapid and reliable conversion of measurement data to holdup quantities is essential.

30761 (ORNL/TM--11882, pp. 146-152) **Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth.** Nishizawa, Kunihide (Nagoya Univ. (Japan)); Nagatsu, Toshiharu; Togari, Akifumi; Matsumoto, Shosei. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004--: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The atmospheric testing of nuclear weapons since 1945 caused a significant increase in the concentration of atmospheric ^{14}C. The ^{14}C concentration in plants that assimilate ^{14}C directly by photosynthesis reflects the atmospheric ^{14}C concentration. Carbon-14 is then transferred into the human body through the food chain. Based on animal experiments, the collagen in human teeth is metabolically inert after its formation. This implies that the collagen of each tooth retains the ^{14}C concentration which reflects the ^{14}C concentration in the blood at the time collagen metabolism ceased. The distribution of the ^{14}C concentration in the collagen of teeth from subjects of various ages would follow a pattern similar to that shown by soft tissues. In this paper the authors elucidate the relationship between the number of nuclear weapon tests and the distribution of ^{14}C concentration in teeth.

30762 (RFP--4592) **Summary of a graded approach to fire hazard analysis.** White, B.W. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. 21 Jul 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. (CONF-9208117--2: 1992 safety analysis workshop, Salt Lake City, UT (United States), 11-13 Aug 1992). Order Number DE92019358. Source: OSTI; NTIS; GPO Dep.

The large consequences from fires stem from the fact that (1) fires spread, damaging physical structures and (2) that the air flow cause by the fire convection currents and the fire compartment pressurization help to distribute the materials involved in the fire. The consequences include dollar loss, impacts to a mission, personnel exposures to chemical and radiological substances and environmental damage. Various groups (e.g. Fire Protection Engineers (FPE) and Safety/Risk Analysis) estimate certain aspects of the consequences depending on the concerns of the group. For instance FPEs traditionally focus on dollar loss and fire prevention aspects, while safety/risk analysts emphasize chemical and radiological consequences. The purpose of the method presented in this paper is to facilitate the implementation of the above guidance in a structured, graded approach. This graded approach has two parts. One part stems from the focal point of the scenario. The other constituent suggests a step-wise method of increasing the sophistication of the analytical techniques. The analytical techniques used to quantify fire hazards (risks) include event trees, handbook correlations, and computer modeling. These can be used in conjunction with each other in a step-wise manner with succeeding steps qualifying the preceding assumptions and results.

30763 (WINCO--11844) **ICPP custom dissolver explosion recovery.** Demmer, R.; Hawk, R. Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States). 11 Jun 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-84ID12435. (CONF-921102--11: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92017277. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the recovery from the February 9, 1991 small scale explosion in a custom processing dissolver at the Idaho Chemical Processing Plant. Custom processing is a small scale dissolution facility which processes nuclear material in an economical fashion. The material dissolved in this facility was uranium metal, uranium oxides, and uranium/fissium alloy in nitric acid. The paper explained the release of fission material, and the decontamination and recovery of the fuel material. The safety and protection procedures were also discussed. Also described was the chemical analysis which was used to speculate the most probable cause of the explosion. (MB)

30764 (WSRC-MS--92-286) **A graded approach to safety documentation at processing facilities.** Cowen, M.L. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-9208117--8: 1992 safety analysis workshop, Salt Lake City, UT (United States), 11-13 Aug 1992). Order Number DE92040048. Source: OSTI; NTIS; INIS; GPO Dep.

Westinghouse Savannah River Company (WSRC) has over 40 major Safety Analysis Reports (SARs) in preparation for nonreactor facilities. These facilities include nuclear material production facilities, waste management facilities, support laboratories and environmental remediation facilities. The SARs for these various projects encompass hazard levels from High to Low, and mission times from startup, through operation, to shutdown. All of these efforts are competing for scarce resources, and therefore some mechanism is required for balancing the documentation requirements. Three of the key variables useful for the decision making process are Depth of Safety Analysis, Urgency of Safety Analysis, and Resource Availability. This report discusses safety documentation at processing facilities.

0550 Safeguards, Inspection, and Accountability

Refer also to citation(s) 30646, 30648, 30709, 30760, 31626, 31628

30765 (BNL--45080) **Simulation of high level neutron coincidence counter.** Lu, Ming-Shih; Teichmann, T. Brookhaven National Lab., Upton, NY (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9207102--47: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019497. Source: OSTI; NTIS; INIS; GPO Dep.

An algorithm for the simulation of HLNC measurement data on a personal computer (PC) has been developed and is presented in this paper. This algorithm is based on a leakage multiplication factor — fissile mass correlation (with three parameters) derived from about 100 sets of published experimental data. Using this algorithm, the simulated totals and reals (coincidence pair) count rates agreed with all measurement data to within 10%. Uncertainties in isotopics as well as the effects of possible contaminants — fluorine or moisture — have also been modelled, but are not discussed in detail in this condensed account. The algorithm has been tested successfully against additional data obtained in field measurements. PC software based on the simulation algorithm has been developed for training inspectors and familiarizing them with HLNC measurement data and with errors affecting HLNC measurements.

30766 (IAEA-INFCIRC–254(Rev.1/Pt.2)) **Communications received from certain Member States regarding guidelines for the export of nuclear material, equipment and technology: Nuclear-related Dual-use Transfers.** International Atomic Energy Agency, Vienna (Austria). Jul 1992. 49p. Order Number DE92644641. Source: OSTI; NTIS (US Sales Only); INIS.

Hard copies are available in English, French, Russian and Spanish from IAEA Div. of Publications, Distribution Unit.

The document reproduces the text of the notes verbales dated 15 May 1992, received by the Director General from the Resident Representatives to the Agency of Australia, Austria, Belgium, Bulgaria, Canada, Czech and Slovak Federal Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia Federation, Spain, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland, and the United States of America relating to the export of nuclear material, equipment and technology and the Guidelines for Transfer of Nuclear-Related Dual-Use Equipment, Material and Related Technology. An Annex to these Guidelines contains the list of Nuclear-Related Dual-Use Equipment and Materials and Related Technology.

30767 (INIS-mf–13346) **IAEA inspections and Iraq's nuclear capabilities.** Gillen, V.A. (ed.). International Atomic Energy Agency, Vienna (Austria). Apr 1992 23p. Order Number DE93602454. Source: OSTI; NTIS (US Sales Only); INIS.

It is reported that IAEA teams have been investigating Iraq's nuclear capabilities since May 1991 and following the Gulf War under terms of United Nations Security Council Resolution 687 directed at eliminating Iraq's weapons of mass destruction and means to produce and use them. A chronology of the events as well as the IAEA plan of further actions are described.

30768 (LA-UR–79-3216) **The in-plant evaluation of a uranium NDA system.** Sprinkle, J.K. Jr.; Baxman, H.R.; Langner, D.G.; Canada, T.R.; Sampson, T.E. Los Alamos Scientific Lab., NM (United States). [1979]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-791117–29: ANS topical conference, Charleston, SC (United States), 26-19 Nov 1979). Order Number DE92019910. Source: OSTI; NTIS; GPO Dep.

The Los Alamos Scientific Laboratory has an unirradiated enriched uranium reprocessing facility. Various types of solutions are generated in this facility, including distillates and raffinates containing ppm of uranium and concentrated solutions with up to 400 grams U/t. In addition to uranyl nitrate and HNO_3, the solutions may also contain zirconium, niobium, fluoride, and small amounts of many metals. A uranium solution assay system (USAS) has been installed to allow accurate and more timely process control, accountability, and criticality data to be obtained. The USAS assays are made by a variety of techniques that depend upon state-of-the-art high-resolution Ge(Li) gamma-ray spectroscopy integrated with an interactive, user-oriented computer software package. Tight control of the system's performance is maintained by constantly monitoring the USAS status. Daily measurement control sequences are required, and the user is forced by the software to perform these sequences. Routine assays require 400 or 1000 seconds for a precision of 0.5% over the concentration range of 5–400 g/t. A comparison of the USAS precision and accuracy with that obtained by traditional destructive analytical chemistry techniques (colorimetric and volumetric) is presented.

30769 (LA-UR–92-2184) **Establishing and operating an incident response team.** Padgett, K.M. Los Alamos National Lab., NM (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208108–1: Workshop on computer security incident handling, Denver, CO (United States), Aug 1992). Order Number DE92018883. Source: OSTI; NTIS; GPO Dep.

Occurrences of improprieties dealing with computer usage are on the increase. They range all the way from misuse by employees to international computer telecommunications hacking. In addition, natural disasters and other disasters such as catastrophic fires may also fall into the same category. These incidents, like any other breach of acceptable behavior, may or may not involve actual law breaking. A computer incident response team should be created as a first priority. This report discusses the establishment and operation of a response team.

30770 (LA-UR–92-2290) **Safeguards technology and computer security training.** Hunteman, W.J.; Zack, N.R. Los Alamos National Lab., NM (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207102–41: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92040188. Source: OSTI; NTIS; GPO Dep.

The Los Alamos National Laboratory Safeguards Systems Group provides a variety of training services to the federal government and its contractors. The US Department of Energy sponsors a Safeguards Technology Training Program at Los Alamos in which seminars are offered concerning materials accounting for nuclear safeguards, measurement control for materials accounting, and variance propagation and systems analysis. These seminars provide guidance and techniques for accounting for nuclear material, developing and quantifying quality nuclear material measurements, and assessing overall accounting system performance. The Safeguards Systems Group also provides training in computer and data security applications; i.e., a workshop and the Los Alamos Vulnerability/Risk Assessment System (LAVA), computer system security officer training, and nuclear material safeguards for managers training, which are available on request. This paper describes the purpose, content, and expected benefits of the training activities that can be applied at nuclear materials facilities or where there are computer and/or data security concerns.

30771 (LA-UR–92-2327) **The use of ring ratios to detect sample differences in passive neutron counting.** Langner, D.F.; Krick, M.S.; Miller, D.W. Los Alamos National Lab., NM (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207102–46: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92018920. Source: OSTI; NTIS; INIS; GPO Dep.

In passive thermal neutron counting, the detection efficiency of a neutron counter is susceptible to changes in the neutron energy spectrum emitted by a sample. Variable levels of moisture and impurities in samples can cause such changes and thus affect the accuracy of an assay. In this work, we use Monte Carlo simulations of thermal neutron measurements in the four-ring pyrochemical multiplicity counter to study the effect of sample-to-sample changes in the emitted neutron spectrum on the ratios of total neutron counts from the different rings. We also present ring ratio data obtained in the pyrochemical multiplicity counter for several pure and impure plutonium bearing samples.

30772 (LA-UR–92-2347) **Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy.** Nishida, K. (Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki (Japan)); Kuno, Y.; Sato, S.; Masui, J.; Li, T.K.; Parker, J.L.; Hakkila, E.A. Los Alamos National Lab., NM (United States); Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki (Japan). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92018916. Source: OSTI; NTIS; INIS; GPO Dep.

The sample preparation method for the isotope dilution gamma-ray spectrometry (IDGS) technique has been further improved for simultaneously determining the plutonium concentration and isotopic composition of highly irradiated spent-fuel dissolver solutions. The improvement includes using ion-exchange filter papers (instead of resin beads, as in two previous experiments) for better separation and recovery of plutonium from fission products. The results of IDGS measurements for five dissolver solutions are in good agreement with those by mass spectrometry with ~0.4% for plutonium concentration and ~0.1% for ^{239}Pu isotopic composition. The precision of the plutonium concentration is ~1% with a 1-h count time. The technique could be implemented as an alternative method for input accountability and verification measurements in reprocessing plants.

30773 Random one-of-N selector. Kronberg, J.W. To Dept. of Energy. 1991. USA Patent patent application 7-643,305. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019827. Source: OSTI; NTIS; GPO Dep.

This invention consists of an apparatus for selecting at random one item of N items on the average comprising counter and reset means for counting repeatedly between zero and N, a number selected by the user, means for activating and deactivating the counter, a comparator to determine if the counter stopped at a count of zero, output means to indicate an item has been selected when the count is zero or not selected if the count is not zero. Randomness is provided by having the counter means cycle very often while varying the relatively longer duration between activation and deactivation of the count. The passive circuit components of the activating/deactivating means and those of the counting means are selected for the sensitivity of their response to variations in temperature and other physical characteristics of the environment so that the response time of the circuitry varies. Additionally, the items themselves, which may be people, may vary in shape or the time they press a pushbutton, so that, for example, an ultrasonic beam broken by the item or person passing through it will add to the duration of the count and thus to the randomness of the selection.

30774 (SAND–92-0472C) **Intra-site secure transport vehicle.** Plugge, M.; Scott, S. Sandia National Labs., Albuquerque, NM (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9207102–40: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92018824. Source: OSTI; NTIS (US Sales Only); GPO Dep.

During the 1980's many facilities involved in handling nuclear material realized a need to enhance safety and security for movement of sensitive materials within their facility, or "intra-site." There have been several prior efforts to improve on-site transportation, including the unique Device Transport Vehicle for the Nevada Test Site. However, there remains a requirement for an improved on-site transporter for a number of other DOE facilities. The requirements for the vehicle are driven by security, safety, and operational concerns. There also is the opportunity to provide a standardized vehicle design. This has many advantages in common validation and certification, training, maintenance, and upgrades. Finally, although the Intra-site Secure Transport Vehicle (ISTV) is being designed to address on-site transportation issues at DOE facilities, the vehicle has application to other transportation concerns where enhanced security or improved cargo protection in impact or fire environments is needed.

30775 (SAND–92-1580) **Nuclear Security Systems Center.** Greer, G.S. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019460. Source: OSTI; NTIS; GPO Dep.

The mission of our Center is to enhance the security, prosperity and well-being of our citizens by the application of a security systems approach incorporating the concepts of protection-in-depth, balance, and cost-effective protection. We will build upon the expertise gained through decades of providing security for the DOE nuclear weapons complex and DoD nuclear weapons storage facilities and solve security problems of national importance. Our mission will be accomplished while: Enhancing our ability to fulfill our role as the lead DOE Laboratory in physical security R&D; enhancing our ability to fulfill our role in nuclear weapons surety; enhancing our ability to respond to security requests from other federal, state,, and local agencies; and providing taxpayers a substantial return on investment, both directly in cost savings and indirectly in leveraged benefits. A brief description of research on security systems is described.

30776 (UCRL-JC–109620) **Recent improvements in plutonium gamma-ray analysis using MGA.** Ruhter, W.D.; Gunnink, R. Lawrence Livermore National Lab., CA (United States). Jun 1992. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9207102–62: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019583. Source: OSTI; NTIS; INIS; GPO Dep.

MGA is a gamma-ray spectrum analysis program for determining relative plutonium isotopic abundances. It can determine plutonium isotopic abundances better than 1% using a high-resolution, low-energy, planar germanium detector and measurement times ten minutes or less. We have modified MGA to allow determination of absolute plutonium isotopic abundances in solutions. With calibration of a detector using a known solution concentration in a well-defined sample geometry, plutonium solution concentrations can be determined. MGA can include analysis of a second spectrum of the high-energy spectrum to include determination of fission product abundances relative to total plutonium. For the high-energy gamma-ray measurements we have devised a new hardware configuration, so that both the low- and high-energy gamma-ray detectors are mounted in a single cryostat thereby reducing weight and volume of the detector systems. We describe the detector configuration, and the performance of the MGA program for determining plutonium concentrations in solutions and fission product abundances.

30777 (UCRL-JC–110104) **An integrated methodology for sabotage vulnerability assessment.** Edmunds, T.A. Lawrence Livermore National Lab., CA (United States). 6 Jul 1992. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9207102–53: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019383. Source: OSTI; NTIS; GPO Dep.

A methodology that provides an estimate of vulnerability to sabotage involving multiple targets in different locations is developed. The technique is a synthesis of fault tree analysis and a pathing algorithm. The fault tree is used to identify cut sets of target components and their locations, while the pathing algorithm identifies the optimal cut set of targets as well as the optimal path through these targets. The methodology implicitly examines all possible adversary sabotage strategies, where a strategy consists of traversing a path through areas in the facility in order to disable a cut set of target components. Because the methodology builds on existing work–a fault tree model and facility safeguards system model are usually available from safety and theft vulnerability studies–the effort required to perform sabotage vulnerability analysis is reduced.

30778 (UCRL-JC–111078) **Access control issues and solutions for large sites.** Warren, F.E. Lawrence Livermore National Lab., CA (United States). Jul 1992. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9207102–55: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019536. Source: OSTI; NTIS; INIS; GPO Dep.

The Lawrence Livermore National Laboratory (LLNL) operates an automated access control system consisting of more than 100 portals. We have gained considerable practical experience in the issues involved in operating this large system, and have identified the central issues to include system reliability, the large user population, the need for central control, constant change, high visibility and the budget. This paper outlines these issues and draws from our experience to discuss some fruitful ways of addressing them.

0560 Legislation and Regulations

Refer also to citation(s) 30658, 30667, 30701, 30766, 30918, 30920

30779 (DOE/RL–92-15) **1992 Report on Hanford Site land disposal restrictions for mixed wastes.** Black, D. USDOE Richland Field Office, WA (United States). Apr 1992. 204p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE92019697. Source: OSTI; NTIS; INIS; GPO Dep.

Since the early 1940s, the contractors at the Hanford Site have been involved in the production and purification of nuclear defense materials. These production activities have resulted in the generation of large quantities of liquid and solid radioactive mixed waste (RMW). This waste is subject to regulation under authority of both the Resource Conservation and Recovery Act of 19761 (RCRA) and Atomic Energy Act. This report covers mixed waste only. Hazardous-only waste is considered in compliance with land disposal restrictions. The Washington State Department of Ecology, US Environmental Protection Agency, and US Department of Energy have entered into an agreement, the Hanford Federal Facility Agreement and Consent Orders (commonly referred to as the Tri-Party Agreement) to bring the Hanford Site operations into compliance with dangerous waste regulations. The Tri-Party Agreement required development of the original land disposal restrictions plan and its annual updates to comply with land disposal restriction requirements for RMW. This report is the second update of the plan first issued in 1990. The Tri-Party Agreement requires, and the baseline plan and annual update reports provide, the following information: waste character information; storage data; treatment information; waste reduction information; schedule; and, progress.

30780 (INIS-mf-13347, pp. 8) **Canadian and U.S. approaches to occupational health regulations.** Wright, M.J. (United Steelworkers of America (Canada)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501-: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADIATION PROTECTION LAWS/canada; OCCUPATIONAL EXPOSURE; CANADA; REGULATIONS; USA

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0702 Radiation Sources

Refer also to citation(s) 30994, 31406, 31539, 31544

30781 (ANL/CP-76789) **Miniature neutron sources: Thermal neutron sources and their users in the academic field.** Egelstaff, P.A. (Guelph Univ., ON (Canada). Dept. of Physics); Carpenter, J.M. Argonne National Lab., IL (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920768-3: Conference on physics and engineering of advanced detectors and collection/focusing systems, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92018793. Source: OSTI; NTIS; INIS; GPO Dep.

The three levels of thermal neutron sources are introduced - University laboratory sources infrastructure sources and world-class sources - and the needs for each kind and their inter-dependence will be emphasized. A description of the possibilities for University sources based on α-Be reactions or spontaneous fission emission is given, and current experience with them is described. A new generation of infrastructure sources is needed to continue the regional programs based on small reactors. Some possibilities for accelerator sources that could meet this need are considered.

30782 (CEAC-R-4-92) **Shielding chalculations in x-rays installations for medical diagnosis. description of the method and computational solution.** Borroto Valdes, M. (Instituto de Medicina del Trabajo, Departamento de Higiene de las Radiaciones, La Habana (Cuba)); Saez, D.G. Comision de Energia Atomica, La Habana (Cuba). 1992 27p. (In Spanish). Order Number DE93601966. Source: OSTI; NTIS (US Sales Only); INIS.

Shielding requirements for x-rays diagnostic installations are investigated. The description of an entirely analytical method for calculation of thickness, based in the papers of Simpkin and NCRP49, is presented. Considerations described in specialized method to solving this problem. A program for microcomputer IBM and compatibles ones is available for estimation of minimum shielding requirements in lead, concrete and steel. Similar results were obtained from comparing with others authors.

30783 (CNIC-00394) **Model SM-1 ballast density gauge.** Gao Weixiang (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Fang Jidong; Zhang Xuejuan; Zhang Reilin; Gao Wanshan. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 12p. (In Chinese). (IAE-0075.). Order Number DE93601977. Source: OSTI; NTIS (US Sales Only); INIS.

The ballast density is one of the principal parameters for roadbed operating state. It greatly affects the railroad stability, the accumulation of railroad residual deformation and the amount of work for railroad maintenance. SM-1 ballast density gauge is designed to determine the density of ballast by using the effect of γ-ray passed through the ballast. Its fundamentals, construction, specifications, application and economic profit are described.

30784 (CNIC-00424) **An elevator for cobalt-60 source.** Tang Zaimin (Beijing Inst. of Nuclear Engineering, BJ (China)); Liang Donghu. China Nuclear Information Centre, Beijing, BJ (China). Jul 1990. 12p. (In Chinese). (BINE-0013.). Order Number DE93601967. Source: OSTI; NTIS (US Sales Only); INIS.

The elevator used for cobalt-60 source is a key device in the irradiation industry. It plays an important role in the safety and control of irradiation operation as well as the utilization rate of radiation source. From 1983 to 1986, Beijing Institute of Nuclear Engineering undertook designing of various size irradiation projects for different uses. Since then a kind of cobalt-60 source elevator suited for the irradiator of wet-source-storage has been chosen. It is reliable in the operation and complete in the function. An automatic control circuit brings the systems of cobalt-60 source elevator into an interlock system which ensures the irradiation operation safety. Besides introducing the structural features and performance of this elevator, the conditions of safety interlocking in raising or lowering the cobalt-60 source is also discussed. The discussion is from the safety viewpoint of operating an irradiator and irradiation technology.

30785 (CNIC-00477) **A method of using γ-ray spectrum of ^{40}K to detect firecrackers.** Liu Nangai (Fifth Research and Design Inst. of Nuclear Industry, Zhengzhou, HEN (China)); Liu Lanhua; Hu Zhihong; Wang Deming. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 7p. (In Chinese). (FRDIN-0005.). Order Number DE93601978. Source: OSTI; NTIS (US Sales Only); INIS.

A non-destructive method using ^{40}K and bismuth germanite scintillator to detect black gunpowder in firecrackers is introduced. The block diagram and performance of detecting time is 10 seconds. The minimum detectable weight of firecracker is 1kg and detecting instrument are also presented. The false discrimination rate is less than 15%. This method is simple and easy to manipulate. It can be used in railway stations, bus terminals and docks.

30786 (CNIC-00505) **Development of ^{60}Co after-loading source.** Hu Liangyou (China Nuclear Power Inst., SC (China)); Zhang Jirong; Liang Guozheng; Li Fanlian; Li Xinghuan. China Nuclear Information Centre, Beijing, BJ (China). Jul 1991. 8p. (In Chinese). (SINRE-0028.). Order Number DE93601968. Source: OSTI; NTIS (US Sales Only); INIS.

A new process for production of ^{60}Co afterloading sources is described and the method for leak detection, contamination examination, decontamination and activity level measurement are introduced. Pure titanium is used for enclosure material of ^{60}Co. It can meet the requirements of mechanical strength and resistance to corrosion and fatigue. The source quality is improved and the old process of production is simplified.

30787 (CNIC-00523) **Development of a ^{60}Co radioactive rod source used for γ-ray level gauge.** Lin Yibing (China Nuclear Power Inst., Chengdu, SC (China)); Pan Liangcai; Yin Shunjiu. China Nuclear Information Centre, Beijing, BJ (China). Sep 1991. 9p. (In Chinese). (SINRE-0030.). Order Number DE93601969. Source: OSTI; NTIS (US Sales Only); INIS.

The installation of level gauge used for urea stripping tower, the structure and forming of radioactive rod source, and the calculation of its approximate linear graduation are described. The theoretical and practical feasibility has been confirmed from the test results of comparing the imported radioactive rod source to the developed radioactive rod source. The technological process of production, method for obtaining distribution of radioactivity along the axis, and the test and operation of developed rod source on site are also presented.

30788 (CNIC-00529) **Using tritium oxide to study moisture transfer in drying phase of mixed dry and wet grain.** Wang

Shuyu (Northeast Agricultural Coll., Haerbin, HL (China)); An Yilu; Wang Chengzhi; Liu Dasen; Zhang Peng; Yin Jun. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 12p. (CSNAS–0050.). Order Number DE93601992. Source: OSTI; NTIS (US Sales Only); INIS.

The internal moisture distribution and process of dry and wet grain moisture transfer in drying phase of mixed dry and wet corn, wheat and rice were studied by using the tritium oxide labelled method. The results show that the drying technology of mixed dry and wet grain has a big range of losing moisture. If the wet grain loses moisture continuously during the whole process, the energy consumption will be reduced. The moisture loss of corn and wheat mainly occurs in those seeds in which the moisture and heat exchange slowly, but for rice it occurs in the heated grains. The process of moisture transfer from inside of the grain to outside shows the direction of moisture gradient is the same with the direction of temperature gradient that is favourable to diffusion of moisture. The study revealed the moisture transfer rule of drying technology and mechanism, and provided a theoretical basis. This technology has advantages of high drying quality and reduction of energy consumption. It provided a new way of drying high moisture grain in northern China.

30789 (INIS-JP–007) **Proceedings of the International conference on evolution in beam applications.** Japan Atomic Energy Research Inst., Tokyo (Japan). 1992 817p. (CONF-911154–: International conference on evolution in beam applications, Takasaki (Japan), 5-8 Nov 1991). Order Number DE93703820. Source: OSTI; NTIS; INIS.

This issue is the collection of the papers presented at the title conference. The 142 of the presented papers are indexed individually. (J.P.N.).

30790 (JAERI-M–92-011) **Construction and operating performance of apparatus for rotating irradiation fiber curing.** Kasai, Noboru (Japan Atomic Energy Research Inst., Takasaki, Gunma (Japan). Takasaki Radiation Chemistry Research Establishment); Seguchi, Tadao. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 43p. (In Japanese). Order Number DE93703482. Source: OSTI; NTIS; INIS.

Apparatus for rotating irradiation fiber curing was designed and constructed for the radiation curing on the synthesis of heat resistant silicon-carbide fiber from organic polycarbosilane fiber. The radiation curing of organic fiber was carried out by high energy electron beam irradiation under helium gas flow atmosphere by rotating fiber bobbin during irradiation. The trapped radicals in the fibers by irradiation were diminished by heat treatment in inert gas in order to prevent oxidation after irradiation in air. This apparatus is composed of irradiation fiber bobbin, irradiation chamber, heat treatment vessel, adiabator insertion box, and evacuation systems. Irradiation chamber and heat treatment vessel have the airtight shutters, and the fiber bobbin is transfered from irradiation chamber to heat treatment vessel without any contact with air (oxygen). In order to decrease temperature rise of the sample by electron beam heating, helium gas cooling fins connected to water cooling pipe are provided in the inside wall of irradiation vessel. The dose of sample fiber on the bobbin is 7 kGy/mA min when 2 MV and 0.5 mA electron beam is irradiated under the bobbin rotation by 1 rpm. Using this apparatus, polycarbosilane fiber of maximum 5 kg can be cured by one time irradiation. The temperature inhomogeneity in the heat treatment vessel is enhanced at higher temperature, but heat treatment of sample can be homogenized by rotation during heat treatment. This apparatus is operated as the pilot plant for the design of industry plant. (author).

30791 (NRCN(TE)–009) **Industrial radiography.** Aloni, A.; Magal, O. Israel Atomic Energy Commission, Beersheba (Israel). Nuclear Research Center-Negev. Feb 1992. 74p. (In Hebrew). Order Number DE93601980. Source: OSTI; NTIS (US Sales Only); INIS.

This publication is meant to be a manual for industrial radiography. As such the manual concentrates on the practical aspects, presenting existing radiographic system and techniques of operation to satisfy specified quality requirements. The manual also reviews the safety aspect of performing radiographic work. (author) systems.

30792 (ORNL/TM–12184) **Conceptual design summary.** Peretz, F.J. Oak Ridge National Lab., TN (United States). Sep 1992. 157p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92041230. Source: OSTI; NTIS; INIS; GPO Dep.

The Advanced Neutron Source (ANS) is a new basic and applied research facility based on a powerful steady-state research reactor that provides beams of neutrons for measurements and experiments in the fields of materials science and engineering, biology, chemistry, materials analysis, and nuclear science. The useful neutron flux for these experiments will be at least five times, and in some cases twenty times, more than is available at the world's best existing facilities. In addition, ANS will provide irradiation capabilities for the production of radioisotopes for medical applications, research, and industry and facilities for materials irradiation testing. The need for a new steady-state neutron research facility in the United States was emphasized by the 1984 National Academy Report and confirmed by the Department of Energy's (DOE's) Energy Research Advisory Board in 1985. These studies defined a minimum thermal neutron flux requirement of 5×10^{19} $m^{-2} \cdot s^{-1}$. The National Steering Committee for an Advanced Neutron Source, with representation from the major fields of science that will use the facility, was established in 1986 and has continued to define the performance requirements and instrument layouts needed by the user community. To minimize technical risks and safety issues, the project adopted a policy of not relying upon new inventions to meet the minimum performance criteria, and the design presented in this report is built on technologies already used in other facilities and development programs: for example, the involute aluminum-clad fuel plates common to HFIR and ILL and the uranium silicide fuel developed in DOE's Reduced Enrichment for Research and Test Reactors program and tested in reactors worldwide. At the same time, every state-of-the-art technique has been implemented to optimize neutron beam delivery at the experiments.

0705 Health and Safety

Refer also to citation(s) 32002

0706 Environmental Aspects

Refer also to citation(s) 30965

08 HYDROGEN

Refer also to citation(s) 30585

30793 (DOE/CH/10093–147) **Hydrogen Program Plan, FY 1993–FY 1997.** National Renewable Energy Lab., Golden, CO (United States); Energetics, Inc., Columbia, MD (United States). Jun 1992. 90p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92010556. Source: OSTI; NTIS; GPO Dep.

This multiyear plan has been developed by the US Department of Energy (DOE) to provide overall guidance and leadership for federal investment in hydrogen research and development (R&D). It suggests critical research programs that can make significant contributions to the development of competitive hydrogen energy systems. It identifies areas where federal research is not timely because even successful results would not sufficiently improve hydrogen's attractiveness in large, national end-use markets. The plan's principal evaluation tool for addressing hydrogen applications is energy pathway analysis. Pathway analysis involves the consideration of all elements of an energy delivery system: required energy input, conversion, transmission, storage, and utilization. Energy losses occur in each of these steps, and inefficiencies are compounded as the energy flow progresses. The final pathway efficiency is the ratio of end-use energy consumed to the input of primary energy. The pathway efficiencies are important because they may affect the required quantity of energy (or fuel), the total delivery system cost, and the level of environmental impact. The analysis shows that some hydrogen pathways are clearly preferable to others when the combined factors of energy efficiency, capital cost, emissions, and domestic resource ownership are considered. Attractive pathways include photoconversion, coal gasification, and bioconversion for both utility and transportation applications. Although they may be preferred approaches, these energy paths involve numerous processes or steps that require technical advancement. The critical technologies that need to be developed if practical hydrogen pathways are to emerge in the mid and long term are listed.

0801 Production

Refer also to citation(s) 31188

30794 (CONF-9111214–) **Summary of the 12th study meeting of hydrogen energy system.** 20 Nov 1991 42p. (In Japanese). From The 12th Study Meeting of hydrogen Energy System; Tokyo (Japan); 20 Nov 1991. Order Number DE93000802. Source: OSTI; NTIS; Available from Hydrogen Energy Systems Society of Japan, Setagaya Tokyo (Japan).

Research summaries are presented from the 12th study meeting on hydrogen energy systems. Topics include studies on the electronic structure of hertiary metallic hydride; hydrogen/air combustion in a small gas turbine; combustion of liquefied natural gas; hydrogen production; economics of hydrogen energy; chemical heat pumps; hydrogen generation on palladium electrodes; thermochemical processes to manufacture hydrogen; and recovery of hydrogen from hydrogen sulfide. Individual projects are processed separately for the data bases.

30795 (NUTEK-B–91-9) **Program of research and development on the production of hydrogen from water: Annual progress report 1990.** Finnstroem, B. (ed.). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1992. 65p. Order Number DE92563022. Source: OSTI; NTIS.

The report summarizes the activities of the IEA Hydrogen program during 1990 and lists names and addresses relevant to the program.

30796 (NUTEK-B–91-9, pp. 39-61) **Photoelectrochemical production of hydrogen.** Nozik, A.J. (Solar Energy Research Institute, Golden, CO (US)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1992. In *Program of research and development on the production of hydrogen from water: Annual progress report 1990.* 65p. Order Number DE92563022. Source: OSTI; NTIS.

In this paper we will first summarize the fundamental principles of the photoelectrochemical generation of hydrogen, then summarize the progress and prognosis for photoelectrolysis technology. Finally, we will present some economic analyses of the technology that will compare solar photoelectrolytic hydrogen production costs with hydrogen generated from fossil and nuclear fuels. 26 refs.

0804 Economic, Industrial, and Business Aspects

Refer also to citation(s) 30794

0830 Combustion

Refer also to citation(s) 30915

09 BIOMASS FUELS

Refer also to citation(s) 30585

0907 Resources

Refer also to citation(s) 30799

0908 Production

30797 (DOE/ER/13505–3) **[Mechanisms of inhibition of viral replication in plants]: Progress report.** Cornell Univ., Ithaca, NY (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER13505. Order Number DE92040181. Source: OSTI; NTIS; GPO Dep.

Progress is described concerning genetic mapping CMV movement genes for CMV coat protein in squash and ToMV gene in tomato. These gene products appear to be involved in resistance to squash and tomato mosaic viruses respectively.

30798 (NUTEK-EO–92-1) **Salix plantation: Machinery, methods and economy.** Danfors, B. (Swedish Inst. of Agricultural Engineering, Uppsala (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden); Swedish Inst. of Agricultural Engineering, Uppsala (Sweden). 1992. 84p. (In Swedish). Project NUTEK-196-073. Order Number DE92563019. Source: OSTI; NTIS.

With 4 p English summary.

Intensive culture forestry is described in an international perspective. Comprehensive and careful preparations before planting Salix are necessary if the plantation is to be successful. In choosing land, mineral soils should be given priority as they offer several different advantages over humus soils. Careful control of perennial weeds is one of the most important measures and should be started during the year before planting. Weed control after planting is one of the most important measures ensuring success of the establishment of a Salix plantation. When planting on mineral soils, use of soil-applied herbicides is mainly recommended, but in the case of humus soils mechanical weed control is preferable. JTI has studied four different principles of supplying plant nutrients, namely application from the air, application with a tractor-mounted distributor shuttle fertilising and manual application. In addition, a machine for high-level spreading and a method for shuttle fertilising with liquid nutrients are also described. The harvesting of Salix is both laborious and expensive. Further technical developments are required as well as new knowledge among farmers with regard to the entire handling of the harvest. The material is harvested either whole for storage on the field or chipped for direct transportation to a combustion plant. Harvest and the handling of the harvested material make up considerable parts of the production costs. Successful tests with combustion of chipped Salix have been made in different types and sizes of furnaces. Studies show that both operational reliability and thermal economy have been improved during recent years. Short rotation forestry is characterized by a large establishment cost and moderate management costs. The grower can choose to make a cost price calculation or a variable costing calculation. The calculations are described in the report.

30799 (NUTEK-EO–92-2) **Biological follow-up in short rotation cultivation on farmland.** Ledin, S.R. (Swedish Univ. of Agricultural Sciences, Uppsala (SE). Dept. of Ecology and Environmental Research); Alriksson, S.B. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Apr 1992. 91p. (In Swedish). Project NUTEK-196-072. Order Number DE92563067. Source: OSTI; NTIS.

The study presented includes five production years. The results show that the stem wood production varies strongly depending on the properties given by Nature to the site, specific conditions of the specific year and stand management. The stem wood production may also vary considerably within one and the same field. Most stands do not grow vigorously until the third year. The highest accumulated stem wood production during these five years has been reached on fine sand with 3-4 per cent humus content with good supply of available water, with 57 tonnes DM/ha, corresponding to 11.4 tonnes/ha and year. The mean value for 27 different stands is 35.8 ± 10.2 tonnes accumulated stem wood, corresponding to 7.2 tonnes/ha and year. The expected mean value for the first cutting cycle was 9 tonnes/ha and year. However, that figure implies successful weed control, fertilization and optimal cutting cycle, measures which have not been fully completed on all farms. The influence of the soil texture on the stand development is considerable. Among the mineral soils, fine sand, loams, clay loams and clays (up to a certain percentage of clay) are suitable for Salix cultivation. Very heavy clays (60 per cent clay and more) are not suitable unless the content of humus is high (12-20 per cent). Sands with the groundwater below one meter's depth are not suitable unless water and nutrients are applied. The soil type alone, classified according to the FAO system, is not a good basis for evaluation of natural production potential of the site. Not until the soil type description has been completed with soil chemical and soil physical data and hydrological facts, can assessment of the fertility of the site be made. Management in the form of weed control and fertilization has a considerable influence on stem wood production (orig). 9 refs.

0909 Processing

Refer also to citation(s) 31139

30800 (AAA-REP-91-8) **Simulation of bioreactors: A literature review.** Saxen, B. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1991. 55p. Order Number DE92562980. Source: OSTI; NTIS.

A study of the relevant literature has been done with the aim of it serving as a basis for the development of an adaptive on-line simulation model for biotechnical processes. The review is limited to the bioreactor, i.e., downstream processing is not considered. Different reactor types are briefly discussed. Summaries of transfer phenomena and simple kinetic expressions are given. A chapter on general modelling principles and monitoring possibilities is included, and some simulation models presented in the literature are reviewed at the end of the study.

30801 (DOE/CH/10093-152) **Electricity from biomass: A development strategy.** National Renewable Energy Lab., Golden, CO (United States). Apr 1992. 114p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92010590. Source: OSTI; NTIS; GPO Dep.

The purpose of this document is to review the current status of biomass power technology and to evaluate the future directions for development that could significantly enhance the contribution of biomass power to US production of electricity. This document reviews the basic principles of biomass electric systems, the previous contributions of industry and the National Biomass Energy Programs to technology development, and the options for future technology development. It discusses the market for biomass electric technology and future needs for electric power production to help establish a market-oriented development strategy. It projects trends in the performance and cost of the technology and examines the changing dynamics of the power generation market place to evaluate specific opportunities for biomass power development. In a separate document, the Biomass Power Program Five Year R&D Plan, the details of schedules, funding, and roles of participating R&D organizations within the R&D program funded by the US Department of Energy (DOE) are presented. In evaluating the future directions for research and development, two cases are examined.

30802 (LUTKDH-TKMB-1017) **The fermentation of lignocellulose hydrolysates with xylose isomerases and yeasts.** Linden, T. Lund Univ. (Sweden). Dept. of Applied Microbiology. 1992. 43p. Order Number DE92563038. Source: OSTI; NTIS.

Untreated spent sulphite liquor (SSL) was fermented with Canida tropicalis, Pichia stipitis, Pachysolen tannophilus, Schizosaccharomyces pombe, Saccharomyces cerevisiae and a co-culture of P. Tannophilus and A. cerevisiae, in the presence of xylose isomerases and 4.6 mM azide. The highest yield of ethanol, 0.41 g/g total sugar was obtained with S. cerevisiae, C. tropicalis, and P. tannophilus produced considerble amounts of polyoles, mainly xylitol. With P. stipitis sugar uptake was rapidly inhibited in untreated SSL. The presence of azide contributed to the yield by about 0.04. The fermentation of hydrogen fluoride-pretreated and acid-hydrolysed wheat straw with S. cerevisiae, xylose isomerase, and azide gave a yield of 0.40 g ethanol/g total sugar. In this substrate the xylose utilisation was 84% compared with 51% in SSL. In the concentration range appropriate for enzymatic xylose isomerization, xylulose was measured in a lignocellulose hydrolysate using HPLC with two hydrogen loaded ion exchange columns in series. SSL was used as a model for lignocellulose hydrolysates. The enzymatic isomerization of xylose to xylulose was followed directly in SSL, providing a method for the direct determination of xylose isomerase activity in lignocellulose hydrolysates. Three different xylose isomerase preparations of L. brevis whole cells were compared with a commercial enzyme preparation Maxazyme GI-immob., with respect to activity and stability. From a continuous SSL fermentation plant, two species of yeasts were isolated, S. cerevisiae and Pichia membranaefaciens. One of the isolates of S. cerevisiae, no. 3 was heavily flocculating. Without acetic acid present, both bakers' yeast and isolate no. 3 showed catabolite repression and fermented glucose and galactose sequentially. Galactose fermentation with bakers' yeast was strongly inhibited by acetic acid at pH values below 6. Isolate no. 3 fermented galactose, glucose and mannose, in the presence of acetic acid even at pH.

30803 (NEI-DK-918) **Report on technical measurements concerning measurement of the suction of tanks at Fangel biomass conversion plant.** Nielsen (A.) A/S Raadgivende Ingenioerer, Odense (Denmark). May 1992 48p. (In Danish). Contract ENS-51161-91.0081. Order Number DE92562880. Source: OSTI; NTIS; INIS.

Prepared for Fangel Miljoe- og Energiselskab A.m.b.a.

The inconveniences caused by the odours emerging from the biomass conversion plant in Fangel, Denmark, and the actions taken in an attempt to reduce them, are described. The plant has on several occasions been threatened with being closed down because of the smell. Airtight coverings have been fixed on all the open tanks, and the suction element has been tested to see if it is airtight. Ozone has been added in order to help get rid of the smell. Measurements have shown that it is possible to attain a small vacuum in the storage tank under normal operation, if there is a surfeit of pumping there will be too high pressure. In relation to pumping-in the pressure can be too high in the first and medium tank. Flow, pressure, hydrogen sulphide and methane concentration changes significantly in relation to the various pumping frequences. The level of hydrogen sulphide removal in the biofilter was 70-85%. The flow of hydrogen sulphide becomes less after the addition of ozone. Measurements implied that the tanks were airtight. Larger vacuums can be achieved by changing the shape of the pipe system and increasing the flow. (AB).

30804 (NUTEK-FBT-92-8) **Conductivity measurements on dolomite at reaction conditions.** Bjoerklund, R.B. (Linkoeping Univ. (SE). Laboratory of Applied Physics); Sjoestroem, K. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1991. 28p. Project NUTEK-276-455. (TRITA-KT-91-10). Order Number DE92563027. Source: OSTI; NTIS.

Catalysts formed from decomposing dolomite at elevated temperatures were studied by electrical conductance and thermogravimetric measurements. The catalysts exhibited p-type semiconductivity in the presence of O_2, but were n-type in inert and reducing atmospheres. Exposure of the catalysts at 800 degrees C to gases typically found in the process stream from biomass gasification resulted in conductance increases for reducing gases such as H_2, CH_4, NH_3, and CO. The conductance increases were stable in the case of CO but slowly decreased with time for the other gases indicating that H species diffused into the dolomite. Reactions of the gases with oxidizing O_2 and NO were followed by conductance measurements. Coke deposited on the dolomite from exposure to C_2H_4 resulted in conductance increases of several orders of magnitude. Weight increases, measured by thermogravimetry, during the coking reaction were about 3%. (34 refs., 6 figs., 2 tabs.) (au).

30805 (NUTEK-TB-92-4) **A simple method for separating fines from fuel chips.** Eriksson, U. (Swedish University of Agricultural Sciences, Garpenberg (SE). Dept. of Operational Efficiency); Moberg, L. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1991. 26p. (In Swedish). Project NUTEK-146-335. (SLU-ST-UPPRLT-224). Order Number DE92563032. Source: OSTI; NTIS.

This paper describes a fuel chip screening-device, which basically consists of a drum equipped with screen plates. A description is also provided of how the device is affected by the drum's load and rotational speed, the design of the screens, and by various types of chips. The method used for the reduction of fines from fuel chips proved to be relatively insensitive to variations in such investigated variables as the hole shape, rotational speed and amount and type of material to be screened. We therefore feel that it is possible to develop a robust screening device for practical operation based on the investigated concept. If the drum is situated at a landing or an industrial site, it should be possible to construct a screening device which will give good results and allow the degree of separation to be varied on demand. With regard to mobile use in conjunction with chipping in the stand, there are some problems, e.g., feeding, power supply, and placement of the drum, and determination of the correct slope to achieve proper flow-through. The economical feasibility of this is unclear, however. There are some restrictions for the usability of the device, including that the desired degree of separation must be within certain limits, and that the separation of small green twigs from fresh spruce chips is not possible. A combustion test showed that upon separation of fines, the energy loss is directly proportional to the degree of separation. The ash content, however, decreases with an increased degree of separation, as the ash content is greatest in the finest fraction. This means that the tested method gives clearly improved fuel quality, and if the method is used in the stand or if the separated materials is brought back, the volume reduction of fines is clearly lower than the loss of nutrients, i.e. more nutrients is left in the stand. (au).

30806 (NUTEK-TB–92-5) **Part 1: Logging residues in piles - Needle loss and fuel quality. Part 2: Nitrogen leaching under piles of logging residues.** Lehtikangas, P. (Swedish Univ. of Agricultural Sciences, Uppsala (SE). Dept. of Forest Products); Lundkvist, H. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden); Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Forest Products. 1991. 51p. (In Swedish). Project NUTEK-146-336;NUTEK-146-313. (SLU-VKL-R–223). Order Number DE92563066. Source: OSTI; NTIS; INIS.

Part 1: Experimental piles were built in three geographical locations during May-Sept. 1989. Logging residues consisted of 95% spruce and 5% pine. Height of the piles varied between 80 and 230 cm. Needles were collected by placing drawers under 40 randomely chosen piles. The drawers were emptied every two weeks during the storage period. Natural needle loss was between 18 and 32% of the total amount of needles after the first two months of storage. At the end of the storage period, 24-42% of the needles had fallen down to the drawers. At the end of the experiment the total needle fall was 95-100% in the shaken piles. According to the results of this study piles smaller than 150 cm had the most effective needle fall. Piles should be placed on open places where the air and sun heat penetrate and dry them. Needles were the most sensitive fraction to variations in precipitation compared to the other components, such as branches. Piles usually dried quickly, but they also rewet easily. This was especially true in the smaller piles. The lowest moisture content was measured at the end of June. The ash content in needles varied between 4 and 8%. 16 refs., 15 figs. Part 2: Three field experiments were equipped with no-tension humus lysimeters. Pairs of lysimeters with the same humus/field layer vegetation material were placed in pairs, one under a pile of felling residues and another in the open clear felling. Leaching of nitrogen as well as pH and electric conductivity in the leachate was followed through sampling of the leachate at regular intervals. The results from the investigation show that: * the amount of leachate was higher in lysimeters in the open clear felling, * pH in the leachate was initially lower under piles of felling residues, * the amount of nitrogen leached was higher in the open clear felling. Thus, storing of felling residues in piles during the summer season did not cause any increase in nitrogen leaching, which had been considered to be a risk.

30807 Simultaneous saccharification and fermentation (SSF) using cellobiose fermenting yeast Brettanomyces custersii (CBS 5512). Spindler, D.D.; Grohmann, K.; Wyman, C.E. To Dept. of Energy. 16 Jan 1991. USA Patent patent application 7-642,268. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92019833. Source: OSTI; NTIS; GPO Dep.

A process for producing ethanol from plant biomass includes forming a substrate from the biomass with the substrate including hydrolysates of cellulose and hemicellulose. A species of the yeast Brettanomyces custersii (CBS 5512), which has the ability to ferment both cellobiose and glucose to ethanol, is then selected and isolated. The substrate is inoculated with this yeast, and the inoculated substrate is then fermented under conditions favorable for cell viability and conversion of hydrolysates to ethanol.

0920 Combustion

Refer also to citation(s) 30810

30808 (NUTEK-FBT–92-7) **Physical modelling of a refuse fueled boiler.** Vaclavinec, J. (Royal Inst. of Tech., Stockholm (SE). Dept. of Heat and Furnace Technology). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Oct 1991. 53p. (In Swedish). Project NUTEK-276-370. Order Number DE92563026. Source: OSTI; NTIS.

A three-dimensional water model in the scale 1:34 have been used to simulate the course of mixing and combustion in a refuse-fulled boiler. Comparisons have been made between the simulation model, a mathematical model, and studies in a full scale combustion plant. (7 refs., 24 figs.).

30809 (NUTEK-FBT–92-9) **Study of a MSW incinerator: Overall operation and on-site measurements in the fire box.** Dos Santos, A.M. (Royal Inst. of Tech., Stockholm (SE). Dept. of Heat and Furnace Technology). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Sep 1991. 25p. Project NUTEK-276-370. Order Number DE92563028. Source: OSTI; NTIS.

A measurement program of a municipal solid waste incinerator was carried out. This is the second and final measurement set taken at Gaerstadverket. This way, a complete data set is available for 3-D model validation. The aim was to measure gas temperature and composition at several levels in the radiative section of the furnace. Simultaneously, all operating conditions were recorded. Three levels were measured with the concentrations of CO_2, CO, O_2, H_2, CH_4, and C_1 to C_3, as well as NO and SO_2, taken. Even though there was a drastic reduction in combustibles with the injection of overfire air (OFA), in the plane 2.5 m above these, there were still remnants of CH_4, C_2H_2 and H_2. The radiative section showed a strong unbalance in species composition with the highest concentration of combustibles being along the front wall of the furnace. The waste composition was derived from the operating data. An error analysis showed the uncertainty on the ash content to be too high to be relied on. The energy balance derived from the new operating data and by using the previous data resulted in very close results for lower heating value (LHV) and efficiency. The exhaust gas composition can also be reasonably predicted. (au).

0930 Economic, Industrial, and Business Aspects

30810 (KTH-KRV-R–91-7) **System study, wood powder heat 30 kW - 3 MW.** Kallner, P. Royal Inst. of Tech., Stockholm (Sweden). Dept. of Thermal Engineering. 1991. 70p. (In Swedish). Order Number DE92563039. Source: OSTI; NTIS.

Biomass fuels are considered important for heat production in the Swedish energy program. To meet CO_2-emission limits fossil fuels have to be replaced. One area in which biomass conversion is of particular interest is in small-scale heating. This study has covered the capacity range up to about 3 MW_{th}. Prime requirements for such systems are that they are fully automatic and have high availability. Wood powder is an upgraded fuel with promising properties in these aspects. It is already being used in a few plants with capacity from 4 to 40 MW_{th}. The purpose of this study was to provide a base for decisions of future developmental work with wood powder heat production. It relies on literature studies, interviews and visits to wood powder facilities. Ideas for small-scale wood-powder heating systems have been presented. Estimated heating costs have been compared with those obtained with other options. Wood powder shows possibilities for lower costs than other fuels. With present oil-prices, however, the profit will not be large enough to result in an extensive conversion. Systems for wood powder heat production at about 3 MW are available on the market. For lower effects this study proposes different solutions which would need a few years to develop into commercial technology.

30811 (NUTEK-TB–92-6) **Growing energy: A national economy analysis of energy from arable land.** Holstein, F. (Swedish Univ. of Agricultural Sciences, Uppsala (SE). Dept. of Economics); Aakesson, N. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden); Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Economics. 1992. 60p. (In Swedish). (SLU-EKON-EX–76). Order Number DE92563070. Source: OSTI; NTIS; INIS.

Examination paper. 4 page English summary.

The purpose of this study is to calculate the total cost to society of producing a certain quantity of energy from arable land. We will also calculate which quantity of energy from arable land that ought to be produced at a certain price of energy. We have studied the following five crops: energy forest, lucerne, reed canary grass, wheat and straw. We have derived the production costs for each of the five crops, and then added the values of some environmental and other external effects. When calculating the production costs we have mainly used results from other peoples work. The externalities that we include are decreased CO_2-emission, decreased nitrogen leakage and change in landscape scenery. Having added the values of these factors to the production costs, we get the total social cost of producing energy from each crop. The production cost include costs for cultivating, harvesting and transporting the crop to the furnace plant. Having the functions of the total social cost for each crop, we can derive the marginal cost functions. In our case these functions are quite simple since the marginal costs are constant and therefore the same as the average total cost. 18 refs., 14 figs.

0940 Transport, Handling, and Storage

Refer also to citation(s) 30798, 30810

0950 Environmental Aspects

Refer also to citation(s) 30803, 30806, 30810

30812 (IVL-B–1057) **Modelling of cadmium fluxes on energy crop land.** Palm, V. Swedish Environmental Research Inst., Stockholm (Sweden). Apr 1992. 30p. Order Number DE92563089. Source: OSTI; NTIS; INIS.

The flux of cadmium on energy crop land is investigated. Three mechanisms are accounted for; Uptake by plant, transport with water, and sorption to soil. Sorption is described with Freundlich isotherms. The system is simulated mathematically in order to estimate the sensitivity and importance of different parameters on the cadmium flow and sorption. The water flux through the soil and the uptake by plants are simulated with a hydrological model, SOIL. The simulated time period is two years. The parameters describing root distribution and evaporation due to crop are taken from measurements on energy crop (Salix). The resulting water flux, water content in the soil profile and the water uptake into roots, for each day and soil compartment, are used in the cadmium sorption simulation. In the cadmium sorption simulation the flux and equilibrium chemistry of cadmium is calculated. It is shown that the amount of cadmium that accumulates in the plant, and the depth to which the applied cadmium reaches depends strongly on the constants in the sorption isotherm. With an application of 10 mg Cd/m^2 in the given range of Freundlich equations, the simulations gave a plant uptake of between 0 and 30 % of the applied cadmium in two years. At higher concentrations, where cadmium sorption can be described by nonlinear isotherms, more cadmium is present in soil water and is generally more bioavailable. 25 refs.

30813 (NUTEK-R–92-10) **Biomass fuels - effects on the carbon dioxide budget.** Eriksson, H. (Swedish Univ. of Agricultural Sciences, Uppsala (SE). Dept. of Forest Soils); Hallsby, G. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Feb 1992. 30p. Order Number DE92563018. Source: OSTI; NTIS; INIS.

It is highly desirable that the effects on the carbon dioxide balance of alternative energy sources are evaluated. Two important alternatives studied in Sweden are the extraction of logging residues left in the forest and willow production on farmland. Considered in isolation, a conversion from stem-wood harvest to whole-tree harvest has a negative effect on the carbon dioxide balance, because the amount of soil organic matter decreases. With the assumption that it takes 20 years for the logging residues to decompose, the net decrease in emissions that would result from the replacement of fossil fuels by logging residues appear moderate after 20 years. However, it will grow significantly as time passes. After 100 years with an annual combustion of logging residues the emissions are 12% of those associated with the production of an equivalent amount of energy through oil combustion. Corresponding values for 300 and 500 years are 4% and 2.5% respectively. In less than 100 years there should be a considerable reduction in the Swedish CO_2-C emissions even if only every second new logging residue-produced TWH replaces a fossil-fuel-produced TWh. From a long-term perspective, effects on carbon reservoirs in Sweden, caused by conversions to whole-tree harvesting in forestry and to willow production on redundant farmland, can be considered negligible in terms of their influence on the carbon dioxide budget of Sweden. The orders of magnitude of influencing fluxes is exemplified in the following: The annual production of 50 TWh, whereof 40 TWh from logging residues, 8 TWh from willow and 2 TWh from annual crops is estimated to cause a total net decrease of the carbon reservoirs within Sweden corresponding to 32 Tg CO_2-C, whereas the annual production of 50 TWh from oil combustion should emit 1200 Tg CO_2-C in 300 years, 2000 Tg CO_2-C in 500 years and so on. (au). 17 refs., 4 tabs.

30814 (SV-UB–91-69) **Techniques for separation of green parts, and nutrient content in green parts.** Hedman, G.; Westerberg, I.; Lindquist, H. Vattenfall Utveckling AB, Aelvkarleby (Sweden). 15 Dec 1991. 34p. (In Swedish). Order Number DE92563091. Source: OSTI; NTIS; INIS.

Collection of wood residues such as branches, twigs and needles after felling leads to the removal of nutrients from the site, which in general is a negative effect. Against this background a number of studies have been conducted to examine the technical possibilities and ecological value of separating the green parts. The following studies have been made and the results are presented in this report: * Separation of needles and twigs, with a conventional chipper, in connection with comminution of piled and dried tree residues with low moisture content, * Removal of green parts of fresh tree residues with a chipper fitted with a modified infeed device, * Study of the nutrient content of needles and twigs. Fresh tree residues were chipped with a specially-designed adjustable infeed device. The equipment was found capable of separating the desired fraction, namely needles and twigs. Of the total amount of material, 5-20 per cent by weight were separated. The material largely consisted of green parts. Well adapted separation of green material may also be of importance for the potential fuel availability since land which should not be utilized for removal of wood fuel because of ecological reasons can be made available if the green parts are left on the site. The study of the nutrient content in the green parts was made on both fresh and piled, dry material. During the storage period in the pile, the nutrient content decreased by half. Calculations show that the amount of plant nutrients possible to return via the separated green parts is small in comparison with the supply occurring through both deposition and weathering as well as litterfall. 6 refs., 10 figs., 6 tabs.

0960 Health and Safety

30815 (IVL-B–1061) **A study of working conditions at biogas extraction, garbage sorting, and handling of hazardous wastes.** Alvarez de Davila, E. Swedish Environmental Research Inst., Stockholm (Sweden). 1992. 55p. (In Swedish). Order Number DE92563090. Source: OSTI; NTIS.

Work environments at landfill gas plants were studied. In the pump station and compressor station, equipment is installed which gives an alarm at high concentration of methane, dangerous temperatures and pressure variation in the landfill gas. Risk for gas collection exists in enclosed spaces such as gas wells and leachate wells. The report proposes measures to improve the personnel's safety at all work situations in these locations. The strong odour from waste constitutes a problem for compactor drivers and workers laying gas pipes or digging gas wells. Several organic compounds such as methanethiol, dimethyl sulphide, ethyl butanoate etc. with a very low odour threshold are formed by degradation of waste and these compounds are strong-smelling. Several suggestions on how to improve the working conditions at the biocells are given in this report. The highest concentrations of dust were measured during tipping of waste into a receiving bunker or on the unloading platform. This report suggests how to reduce exposure to organic dust, bacteria and endotoxins. During recent years, several landfills has started to use leachate for irrigation of energy forests. As leachate contains microorganisms, the spreading of aerosols should be limited so that personnel is not exposed to leachate mists during spray irrigation. In this study, the occupational accidents and diseases that has occurred in the landfills were compiled. An increase of the frequency of injuries has been observed in recent years (1986-1990). Sprains and dislocations were the most common type of occupational injuries among all reported accidents. Musculoskeletal diseases dominated among the registered occupational diseases. 21 refs.

0980 Waste Management

Refer also to citation(s) 30812, 30814, 30815, 30868

10 SYNTHETIC FUELS

Refer also to citation(s) 30585

13 HYDRO ENERGY

1305 Economic, Industrial and Business Aspects

30816 (APA–92019118) **Divestiture summary report: Sale of Eklutna and Snettisham hydroelectric projects.** USDOE Alaska Power Administration, Juneau, AK (United States). Apr 1992. 192p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019118. Source: OSTI; NTIS; GPO Dep.

This report accompanies the legislative proposal to authorize sale of the two Alaskan Federal hydroelectric projects and close out the Alaska Power Administration (APA). The 78,210 kill Snettisham Project serving Juneau would be sold to the Alaska Energy Authority, a State corporation which owns six other hydroelectric projects. The 30,000 kill Eklutna Project serving the Anchorage and Matanuska Valley areas would be sold to the three electric utilities which now purchase power from that project. Terms and conditions for the sales are set out in negotiated Purchase Agreements. Key aspects include: (1) Development of Transition Plans within six months after Congress authorizes the divestiture. (2) Transaction Date to be set in the Transition Plans. (3) Description of assets to be transferred. (4) Price and payment terms. (5) Environmental Management Plans. (6) Protection of interests in several important "non-power" uses of project land and water. Under a separate agreement, the Purchasers assume responsibility for developing and implementing post-sale programs for protection, mitigation, and enhancement of fish and wildlife resources impacted by hydroelectric development in the Eklutna and Snettisham basins. The estimated sale proceeds to the United States Treasury are between $73.5 and $80.3 million, assuming the transactions are completed between October 1, 1992 and October 1, 1993. Eklutna and Snettisham are modest-sized, single-purpose hydroelectric projects involving small river basins entirely within Alaska. Locally, they are important long-term suppliers of economically-priced hydroelectric power. The sale terms and structure assure that the projects will continue to serve their intended purposes. Modest rate increases are expected over the short term, but long-term power rates are expected to be similar to those that would prevail under continued Federal ownership.

1306 Environmental Aspects

Refer also to citation(s) 30816, 31750

30817 (DOE/BP/12031–1) **Umatilla Satellite and Release Sites Project: Final siting report.** Montgomery (James M.), Inc., Bellevue, WA (United States). Apr 1992. 161p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC79-91BP12031. Order Number DE92040058. Source: OSTI; NTIS; GPO Dep.

This report presents the results of site analysis for the Umatilla Satellite and Release Sites Project. The purpose of this project is to provide engineering services for the siting and conceptual design of satellite and release facilities for the Umatilla Basin hatchery program. The Umatilla Basin hatchery program consists of artificial production facilities for salmon and steelhead to enhance production in the Umatilla River as defined in the Umatilla master plan approved in 1989 by the Northwest Power Planning Council. Facilities identified in the master plan include adult salmon broodstock holding and spawning facilities, facilities for recovery, acclimation, and/or extended rearing of salmon juveniles, and development of river sites for release of hatchery salmon and steelhead. The historic and current distribution of fall chinook, summer chinook, and coho salmon and steelhead trout was summarized for the Umatilla River basin. Current and future production and release objectives were reviewed. Twenty seven sites were evaluated for the potential and development of facilities. Engineering and environmental attributes of the sites were evaluated and compared to facility requirements for water and space. Site screening was conducted to identify the sites with the most potential for facility development. Alternative sites were selected for conceptual design of each facility type. A proposed program for adult holding facilities, final rearing/acclimation, and direct release facilities was developed.

30818 (DOE/BP/16475–2) **South Fork Clearwater River habitat enhancement - Nez Perce National Forest.** Siddall, P. Forest Service, WY (United States). Nez Perce National Forest. Apr 1992. 137p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI79-84BP16475. Order Number DE92040057. Source: OSTI; NTIS; GPO Dep.

In 1984, the Nez Perce National forest and the Bonneville Power Administration entered into a contractual agreement which provided for improvement of spring chinook salmon and summer steelhead trout habitat in south Fork Clearwater River tributaries. Project work was completed in seven main locations: Crooked River, Red River, Meadow Creek Haysfork Gloryhole, Cal-Idaho Gloryhole, Fisher Placer and Leggett Placer. This report describes restoration activities at each of these sites.

30819 (DOE/BP/38906–1) **Rock Island Dam smolt monitoring, 1991.** Peven, C.M. Public Utility District No. 1 of Chelan County, Wenatchee, WA (United States). Power Operations Dept. Sep 1991. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC79-88BP38906. Order Number DE92040082. Source: OSTI; NTIS; GPO Dep.

Downstream migrating salmon and steelhead trout (Oncorhynchus spp.) smolts were monitored at the Rock Island Dam bypass trap from 1 April–31 August, 1991. This was the seventh consecutive year that the bypass trap was monitored. Data collected included: number of fish caught by species, number of branded fish caught by species, daily average riverflow, daily average powerhouse #1 and #2 flows and daily average spill. These data were transmitted to the Fish Passage Center, which manages the Smolt Monitoring Program throughout the Columbia River Basin. The Smolt Monitoring Program is used to manage the water budget, releasing upstream water storage allocated to augment river flows to decrease migration timing of juvenile salmonids to the sea. The Rock Island Dam trapping facility collected 104,855 downstream migrating salmonids in 1991. Collected fish included 424 chinook salmon (0. tshawytscha) and 710 steelhead (0. mykiss) which had been freeze branded to determine migration rates and 10,709 chinook and 14,078 steelhead with clipped adipose fins. The middle 80% of the 1991 spring migration passed Rock Island Dam during a 34 day period, 5 May–8 June. Passage rates of chinook and steelhead smolts released from hatcheries and the downstream migration timing of all salmonids are presented. The spring migration timing of juvenile salmonids is strongly influenced by hatchery releases above Rock Island Dam.

14 SOLAR ENERGY

1403 Economic, Industrial, and Business Aspects

30820 (EUR–13581) **Life cycle cost analysis of solar heating and DHW systems in residential buildings.** Colombo, R. (Commission of the European Communities, Ispra (Italy). Joint Research Centre); Gilliaert, D.; Landabaso, A. Commission of the European Communities, Luxembourg (Luxembourg). 1992. 17p. Source: OSTI; NTIS (US Sales Only); INIS.

Economic Life Cycle Cost Analysis (ELCCA) is an easy and friendly computer program, IBM compatible for economic evaluation of solar energy system which involves comparison of the capital and operating costs of a conventional system. In this section we would like to suggest the ELCCA-PC program as a new tools using life cycle cost analysis for annual and cumulative cash flow methodology that take into account all future expenses. ELCCA-PC program considers fixed and changeable items that are involved in installing the equipment such as interest of money borrowed, property and income taxes, current energy cost for electricity operating system, maintenance, insurance and fuel costs and other economic operating expenses. Moreover fraction of annual heating load supplied from solar system is considered in this analysis. ECC-PC program determines the yearly outflow of money over the period of an economic analysis that can be converted to a series of equal payments in today's money.

1405 Solar Energy Conversion

30821 (NREL/TP–411-4995) **Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992.** Catalano, A. (Solarex Corp., Newtown, PA (United States). Thin Film Div.); Bennett, M.; Chen, L.; D'Aiello, R.; Fieselmann, B.; Li, Y.; Newton, J.; Podlesny, R.; Yang, L. National Renewable Energy Lab., Golden, CO (United States); Solarex Corp., Newtown, PA (United States). Thin Film Div. Aug 1992. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92010599. Source: OSTI; NTIS; GPO Dep.

This report describes work to demonstrate a multijunction module with a "stabilized" efficiency (600 h, 50°C, AM1.5) of 10.5%. Triple-junction devices and modules using a-Si:H alloys with carbon and germanium were developed to meet program goals. ZnO was used to provide a high optical transmission front contact. Proof of concept was obtained for several important advances deemed to be important for obtaining high (12.5%) stabilized efficiency. They were (1) stable, high-quality a-SiC:H devices and (2) high-transmission, textured ZnO. Although these developments were not scaled up and included in modules, triple-junction module efficiencies as high as 10.85% were demonstrated. NREL measured 9.62% and 9.00% indoors and outdoors, respectively. The modules are expected to lose no more than 20% of their initial performance. 28 refs.

30822 (NREL/TP–451-4938) **Microscopic origins of metastable effects in a-Si:H and deep defect characterization in a-Si,Ge:H alloys: Annual subcontract report, 1 February 1991–31 January 1992.** Cohen, J.D. (Oregon Univ., Eugene, OR (United States)). National Renewable Energy Lab., Golden, CO (United States); Oregon Univ., Eugene, OR (United States). Jul 1992. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92010588. Source: OSTI; NTIS; GPO Dep.

This report describes works to use transient photocapacitance and photocurrent measurements to determine the deep defect distribution and processes in low-band-gap a-Si,Ge:H alloys. Samples for these studies were produced by the photochemical vapor deposition (photo-CVD) growth method and were obtained through a collaboration with researchers at the University of Delaware. This report discusses how a detailed comparison between the photocapacitance and photocurrent spectra can be used to separately examine the majority and minority carrier processes. The results are as follows: (1) The midgap defect densities in the alloy regime near 1.3 eV can be as low as 5×10^{16} cm^{-3} in such photo-CVD samples. (2) There exists a second defect band roughly 0.4 eV below E_c of a similar magnitude to the midgap defect density that exhibits significant lattice relaxation behavior in its electron trapping dynamics. (3) The hole $\mu\tau$ products determined for the lowest defect sample are roughly 5×10^{-10} cm^2/V, comparable with the highest hole $\mu\tau$ products reported in sandwich geometry measurements for alloys in this composition range. (4) The hole $\mu\tau$ is found to be roughly inversely proportional to the midgap defect density for the samples studied. This is consistent with the fact that the effective minority carrier lifetime for such measurements is limited by the deep state trapping time.

30823 (NREL/TP–451-4962) **Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992.** Silver, M. (North Carolina Univ., Chapel Hill, NC (United States)). National Renewable Energy Lab., Golden, CO (United States); North Carolina Univ., Chapel Hill, NC (United States). Jul 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92010593. Source: OSTI; NTIS; GPO Dep.

This report describes the first year of a continuing research study to understand how recombination, trapping, and band-mobility modification affecting the electronic properties of amorphous semiconductors can be measured, characterized, and described by an appropriate spectrum of defect states, and how light-induced defects in a-Si:H and native defects in a-SiGe:H affect transport properties in these materials. The objective was to determine how the Staebler-Wronski defects affect the electronic processes in a-Si:H and a-SiGe:H films. To do this, electroluminescence (EL) and forward bias current in p-i-n devices (i-layer thickness > 2 μm) were studied both experimentally and theoretically before and after light soaking. A simple picture was developed to compare forward bias current to the EL signal. The result was unexpected: the product of the final current times the rise time was not constant before and after light soaking as expected from the concept of gain band width, but instead changed radically. The rise time t_x increased by more than one order of magnitude while the final current I_f did not change significantly with light soaking. On the other hand the $I_f t_x$ product did hold close to a constant when only the applied voltage changed.

1406 Photovoltaic Power Systems

30824 (LUTEDX-TEIE–5057-1-60-91) **Optimizing of a photovoltaic system for supplying a residential with electricity.** Strandberg, J. Lund Univ. (Sweden). Dept. of Industrial Electrical Engineering and Automation. 1991. 62p. Order Number DE92563055. Source: OSTI; NTIS.

A photovoltic system for supplying a residential in Skaane with electricity today and in the future, has been evaluated and constructed. A pV-system disconnected from the grid contains four main components. The solar cells converts sunlight to DC-power. The battery is used to store surplus energy from the day and use it during night when the solar cells don't produce any energy. The inverter converts DC to three-phase AC-power and the controllers control the system to incrase its efficiency. Calculations show that the capital cost for the battery is much larger than the income it can produce which means that a grid connected pV-system should be built without battery. A less costly controlling unit. The best method of operation for a grid connected pV-system is to send all produced energy from the solar cells to the load while possible surplus is exported to the grid. If the solar cells can't satisfy the load with energy the remaining part is imported from the grid. The solar cell production and the load consumption is deciding whether the grid is exporting or importing energy. When pV-systems become competitive is hard to predict because of technical problems and the economy. With the new invented solar cell based on photosynthesis and with an energy cost development as today, the pV-generated energy may be competitive sometime around the year 2010. 22 refs., 42 figs., 6 tabs.

1407 Solar Thermal Power Systems

Refer also to citation(s) 30830

1409 Solar Thermal Utilization

30825 (DTH-LV-MEDD–223) **Solar heating system for the combined space heating of and domestic hot water: Development of a competitive system. Calculations and measurements in relation to the test plant.** Ellehauge, K. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Aug 1991. 80p. (In Danish). Contract EM-1213/88-10. Order Number DE92562846. Source: OSTI; NTIS.

EFP-88.

The aim was to develope a solar system for the combined heating of rooms in buildings and domestic hot water. Work was based on optimal temperature stratification in the storage tank in the domestic hot water systems. Various configurations of combined systems were analyzed with the help of a computerized simulation programme EMGP3. The systems were analyzed in relation to villas with oil or gas space heating, low energy houses etc. The extent of energy saving and cost reduction was examined. It was also investigated if the system would be economically more suitable for domestic water heating alone. It was found that in the case of electrically heated villas, the use of most of the systems with moderate sized solar collector areas (up to 10 square meters) led to reduced costs. In the case of oil or gas-heated villas, especially where the drain-back system was utilized, the cost was reduced in relation to where a system was used for hot water heating only. (AB) (23 refs.).

30826 (ETSU-S–1163/7) **Solar building study. Final report: Spinney Gardens [Crystal Palace, London].** Solar Building Study. Vaughan, N.; Alexander, D.; Jenkins, H.; Jones, P.; Drayton, R. University of Wales Coll. of Cardiff (United Kingdom). Welsh School of Architecture. Oct 1991. 123p. Order Number DE92565717. Source: OSTI; NTIS (US Sales Only).

Work performed under the Energy Performance Assessments (EPA) Project.

The performance of a two-storey terraced house with passive solar heating features is described. Total annual fuel use of 10896 kWh compared very favourably with that of a well insulated double glazed design. Fuel used for space heating was 80 kWh/m^2/year. The energy performance was substantially influenced by solar gains. Without such gains gas use for space heating would have been 30% higher. The solar performance was not at the expense of occupant comfort, for there was little reported overheating, due to the adequate isolation of the conservatory from the living areas. Although very comfortable the building was most valued for its character, which was strongly influenced, both indoors and out, by the conservatory. At Pound 518/m^2 GFA (71m^2) (2nd 1/4 1989) Spinney Gardens, with a conservatory, was estimated to cost more than comparable traditional house Pound 506/m^2 GFA (64m^2) without a conservatory. (author).

30827 (SIB-TN–28) **The energy balance of sloping glazings: Simple empirical correlations between the energy flow through a triple glass roof and the outdoor climate.** Glaumann, M. National Swedish Inst. for Building Research, Gaevle (Sweden). May 1992. 93p. (In Swedish). Order Number DE92563050. Source: OSTI; NTIS.

The aim of this investigation was to demonstrate and discuss the influence of local climate on the energy balance of sloping glazings in a Nordic climate. During one winter and one spring period temperature gradients, net radiation, air movements and heat flow were monitored on the inside and outside of the triple glazing above a heated atrium. The collected data were stepwise correlated with the external climate variables - solar radiation, long wave counterradiation, ambient temperature, wind speed and humidity. Finally the linear relationships established were used for hourly simulations of energy flow through glass roofs with different slopes and orientations in two different cities 800 km apart. The correlations were high for energy flow and radiation and relatively high for convection and indoor temperature. A relationship between the interior vertical gradient and the net radiation was also established. The results show that some 40% of the solar irradiation falling on the glazing contributed to the heating of the atrium. Cloudiness influenced the heat flow during nights with about 10%. Wind had only a slight effect on the heat loss through the glazing. The 30 degrees tilted glass roof had an average U-value that was 5-6% greater than for the corresponding vertical glazing. Taking into consideration savings from adjacent spaces the yearly losses accounted for 110 kWh/m^2 in the southern city and 200 kWh/m^2 per floor area in the northern city.

1410 Solar Collectors and Concentrators

30828 (DOE/SF/16592–T1) **Participation in multilateral effort to develop high performance integrated CPC evacuated collectors: Final report, July 1, 1986–May 31, 1987.** Winston, R.; O'Gallagher, J.J. Chicago Univ., IL (United States). Enrico Fermi Inst. 31 May 1992. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-86SF16592. Order Number DE92015946. Source: OSTI; NTIS; GPO Dep.

The University of Chicago Solar Energy Group has had a continuing program and commitment to develop an advanced evacuated solar collector integrating nonimaging concentration into its design. During the period from 1985–1987, some of our efforts were directed toward designing and prototyping a manufacturable version of an Integrated Compound Parabolic Concentrator (ICPC) evacuated collector tube as part of an international cooperative effort involving six organizations in four different countries. This "multilateral" project made considerable progress towards a commercially practical collector. One of two basic designs considered employed a heat pipe and an internal metal reflector CPC. We fabricated and tested two large diameter (125mm) borosilicate glass collector tubes to explore this concept. The other design also used a large diameter (125mm) glass tube but with a specially configured internal shaped mirror CPC coupled to a U-tube absorber. Performance projections in a variety of systems applications using the computer design tools developed by the International Energy Agency (IEA) task on evacuated collectors were used to optimize the optical and thermal design. The long-term goal of this work continues to be the development of a high efficiency, low cost solar collector to supply solar thermal energy at temperatures up to 250°C. Some experience and perspectives based on our work are presented and reviewed. Despite substantial progress, the stability of research support and the market for commercial solar thermal collectors were such that the project could not be continued. A cooperative path involving university, government and industrial collaboration remains the most attractive near term option for developing a commercial ICPC.

30829 (SAND–91-7017) **Process designed for experimentation for increased-caliper Fresnel lenses.** Zderad, A.J. (Minnesota Mining and Mfg. Co., St. Paul, MN (United States). Optics Technology Center). Sandia National Labs., Albuquerque, NM (United States); Minnesota Mining and Mfg. Co., St. Paul, MN (United States). Optics Technology Center. Apr 1992. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019464. Source: OSTI; NTIS; GPO Dep.

The feasibility of producing increased caliper linear and point focus Fresnel lenses in a continuous sheet is described. Both a 8.16-inch-square radial 2 x 7 parquet, and a 22-inch-wide linear lens were produced at .11-inch in caliper. The primary purpose of this experimentation is to determine the replication effectiveness and production rate of the polymeric web process at increased thickness. The results demonstrated that both radial and linear lenses, at increased caliper, can be replicated with performance comparable to that of the current state-of-the-art 3M laminated lenses; however, the radial parquets were bowed on the edges. Additional process development is necessary to solve this problem. Current estimates are that the .11-inch caliper parquets cost significantly more than customer laminated parquets using 0.022-inch thick lensfilm.

30830 (SAND–92-0668) **Mirror alignment techniques for point-focus solar concentrators.** Diver, R.B. Sandia National

Labs., Albuquerque, NM (United States). Jun 1992. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019643. Source: OSTI; NTIS; GPO Dep.

Accurate alignment and focus of mirror facets are critical for the integration of concentrators and receivers in many of the low-cost stretched-membrane concentrators currently under development. In this report, the theoretical development of computer software that traces light rays from a source to a facet of a point-focusing solar concentrator and then to a target is given. Examples of approaches for the alignment of faceted point-focusing solar concentrators, which make use of targets generated by this computer program, are also presented.

1420 Heat Storage

30831 (NUTEK-SL–92-1) **Seasonal storage of solar heating at Nynaeshamn.** Sahlqvist, L. (Nynaeshamn Energi AB (SE)); Alfredsson, M.; Hultmark, G.; Lenhoff, B. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1992. 37p. (In Swedish). Project NUTEK-654-021. Order Number DE92563069. Source: OSTI; NTIS.

In the areas which are intended to be connected to district heating, the total net heating need is estimated to 53 GWh/year. The total possible expansion is judged to more than 100 GWh/year. The district heating networks will mainly provide blocks of flats, but also some industry, hospitals and schools will be connected. In Nynaeshamn there are storage rooms in rock caverns intended for oil storage. These storage rooms are not being used any more and one group has never been used. This group contains 700 m^3 water volume. Only two out of four rooms in this group is needed in this project. Since the storage rooms never have been filled with oil, the preparation cost for using them will be low. Flat, ground based solar collectors with convection barriers will supply 75% of the district heating energy need. For this, 126 000 m^2 solar collectors are needed. The remaining 25% are intended to be heated by oil-fired boilers. During the construction period, estimated to 10 years, electricity will be used to heat the storage rooms. In the financial calculations a market is anticipated on the loans for the needed capital. The project shows a surplus the fourth year after completion of the solar collector field. Thereafter the project is profitable with increased profits every year. Approx MSEK 250 must be invested in the project.

15 GEOTHERMAL ENERGY

Refer also to citation(s) 32573

1501 Resources and Availability

30832 (ETDE/JP-mf–92562509) **Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan.** Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992 177p. (In Japanese). Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

This report is a summary of the result outline of researches on geothermal resource evaluation of Japan, which are carried out as a part of the Sunshine Project by the Agency of Industrial Science and Technology. From FY 1990, these researches are divided into two research items, researches on preparation of data interpretation standards and new resource evaluation methods. In the first item, the following subjects : (1) comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data, (2) statistical distribution of temperatures and physical properties of geothermal areas of Japan, based on logging and core data of boreholes, (3) compilation of a gravity map on 1/500,000 Niigata Sheet, (4) preparation of geothermal resource maps of Japan, and (5) a hypothesis on competition of thermal conduction zone and juvenile hydrothermal solution retention zone in the surroundings of magma, are included. In the second item, (1) study of geothermal resource evaluation by potential water volume method, and (2) temperature gradient map of the Japanese Islands, are included. 217 refs., 53 figs., 10 tabs.

30833 (ETDE/JP-mf–92562509, pp. 59-99) **Preparation of geothermal resource map of Japan.** Yamaguchi, Y. (Geological Survey of Japan, Tsukuba (Japan)); Kanehara, K.; Tamao, S. Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

Geothermal resource areas of the whole country of Japan were educed, and the distribution map of them was prepared. And the preparation of maps of the areas of researches on geothermal sources and development projects which were already carried out by the national agencies up to present were carried out. Moreover, as to the areas where boring surveys were carried out, the highest temperatures obtained by borings were compiled in a list. In this study, geothermal resources were divided into three types, (1) geothermal resource reserve area being related to Quaternary volcanoes, (2) geothermal resource reserve area which is not related to Quaternary volcanoes, and (3) deep hydrothermal solution resource reserve area. The first type is the area having volcanic rock distributions of middle and late Pleistocene and Recent of Qeaternary and the surroundings with 5 km extension, where there are one hot spring or more of above 42°C. The second type is the area which is not included in the first and the third types, and have one hot spring or more of above 42°C. The third type is the distribution areas of late Pleistocene and Recent sediments, where there are one hot spring or more of above 42°C. 135 refs., 2 figs., 2 tabs.

30834 (ETDE/JP-mf–92562509, pp. 117-126) **Study of geothermal resource evaluation by potential water volume method.** Miyazaki, Y. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

In this study, a geothermal resource evaluation method using lumped parameter model (tank model) is examined, in order to perform more precise resource evaluation than the conventional volume method, by using effectively the information of various physical properties of geothermal reservoirs, which increased according to the progress of geothermal prospecting. In tank model, a different zone of reservoir is expressed with one or a few connected cells. A reservoir is considered as a large vessel, and under the prerequisite that the interior is usually in equilibrium state, pressure change behavior in the reservoir accompanied with the production of steam and fluid is investigated, geothermal resource volume in the initial state is supposed, and the prediction of production in the future is performed. Some considerations were carried out on the problems in the geothermal resource evaluation by potential water volume method using tank model. The effects of recharge factor on fluid production volume were examined. 32 refs., 3 figs.

30835 (ETDE/JP-mf–92562517, pp. 67-78) **Study on collection of resource evaluation bases in the northern Tohoku district (Akita-Koma).: Geological survey of Tashirodake and Tara-Komagadake areas.** Sudo, S. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

The objective of this investigation is to evaluate the geothermal resource potential through an estimation of age and amount of volcanic rocks extruded to the surface, which are distributed in the northern Tohoku district. The present report summarizes the results of geological field survey, which was conducted in the Tashirodake and Tara-Komagadake areas, Akita Prefecture, and paleomagnetism measurements of rock specimens. Field works were carried out for four routes in the Tashirodake area and two routes in the Tara-Komagadake area. Detailed observations were conducted at ten lacalities and oriented rock samples were collected. Paleomagnetisms were measured for 32 oriented rock specimens. Consequently, it was estimated that the activity of Tashirodake volcano was initiated by the activity of andesite lava in the western part of Akaishi area and by the activity of extrusion of andesite lava forming lower part of Tashirodake main body. On the other hand, it was also estimated from the results of paleomagnetism measurements that the activity of Tara-Komagadake was initiated by the activity of andesite lava at the reversing period of pole about 0.73Ma before. 2 figs., 2 tabs.

30836 (ETDE/JP-mf--92562517, pp. 81-92) **Basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map 'Niigata'.** Takahashi, M. (Geological Survey of Japan, Tsukuba (Japan)); Yamaguchi, Y.; Noda, T.; Komazawa, M.; Murata, Y.; Tamao, S. Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

This report describes basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map " Niigata".This basic map expresses the distribution and occurrence of prospective geothermal potential regions clearly by using geological and geothermal data. Geologic distribution map, acid hydrothermal alteration zone and active volcano distribution map, and tectonic map were made on the basis of 1:500,000 neotectonic map " Niigata ". Geothermal index map was also made on the basis of the nationwide survey of geothermal exploration and the geothermal development and promotion survey which have been promoted by New Energy and Industrial Technology Development Organization (NEDO). Furthermore, thermal spring distribution map, fumarole area distribution map, geothermal exploration well distribution map, and table of chemical composition of thermal spring waters were completed. The prospective geothermal potential regions were extracted on the basis of temperature of thermal spring water, scale of alteration zone, and geothermal temperature. Problems during the basic mapping and future improvements were also discussed. 11 refs., 1 fig., 3 tabs.

30837 (LA-UR--92-2189) **Status and prospects for hot dry rock (HDR) in the United States.** Brown, D.; Duchane, D. Los Alamos National Lab., NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921083--6: Geothermal resources council meeting, San Diego, CA (United States), 4-7 Oct 1992). Order Number DE92018876. Source: OSTI; NTIS; GPO Dep.

The vast majority of accessible geothermal energy exists in the form of heat stored in dry rock at depth. For nearly the last two decades, the Los Alamos National Laboratory has been engaged in a program to develop the technology to mine the thermal energy in this hot dry rock (HDR). The world's first heat mine was developed and operated at Fenton Hill, N.M. in the 1970's by using drilling and hydraulic fracturing techniques to create an artificial reservoir in hot rock and subsequently circulating water through this reservoir to mine the heat from the rock. Over the last ten years, a much larger, deeper, and hotter heat mine has been constructed at Fenton Hill and a permanent energy extraction plant has been built on the surface. A long-term testing program has recently begun to evaluate the potential for sustained energy extraction from the large Fenton Hill heat mine. This paper summarizes the history of HDR research and development at Los Alamos, reports the initial results of the long-term testing program at Fenton Hill, and discusses the possible future course of HDR technology.

30838 (LA-UR--92-2489) **Prospects for the commercial development of hot dry rock geothermal energy in New Mexico.** Duchane, D.V.; Goff, F. Los Alamos National Lab., NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209164--3: New Mexico conference on the environment: toward a sustainable environment, Albuquerque, NM (United States), 13-15 Sep 1992). Order Number DE92018999. Source: OSTI; NTIS; GPO Dep.

A vast store of energy is available to the world in the form of hot dry rock (HDR) which exists almost everywhere beneath the surface of the earth. The Los Alamos National Laboratory has developed technology to mine the heat from HDR by using techniques developed in the petroleum industry. In practice, an artificial reservoir is created in the hot rock and water is circulated through the reservoir to extract the thermal energy and bring it to the surface. There are virtually no adverse environmental effects from an HDR plant when the system is operated in a closed-loop mode with the process water continually recirculated. An experimental plant at Fenton Hill, NM is now undergoing long-term testing to demonstrate that energy can be obtained from HDR on a sustained basis with operational procedures which are readily adaptable to industry. Significant HDR resources exist in the state of New Mexico. Resources in the Valles Caldera, Zuni Uplift, and Rio Grande Rift have been evaluated in detail. Studies indicate that it should be possible to economically develop high grade HDR resources with technology available today. As advanced concepts for developing and operating HDR systems are investigated, even more widespread utilization of the technology will be commercially feasible.

1502 Geology and Hydrology of Geothermal Systems

Refer also to citation(s) 30834

30839 (ETDE/JP-mf--92562509, pp. 31-48) **Statistical distribution of temperatures and physical properties of geothermal areas in Japan, based on logging and core data of boreholes.** Yano, Y. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies ofthe geothermal resource evaluation of Japan.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

The purpose of this study is to obtain statistical distribution of temperatures and physical properties of geothermal areas, based on logging and core data of boreholes drilled in Japan. The examination was performed on about 300 geothermal prospecting boreholes in the whole country of Japan. There exist upward stream type, downward stream type and conduction type equivalently in underground temperatures of geothermal areas. The average of borehole temperatures is 75 °C at 500 m, 120 °C at 1000 m, 160°C at 1500 m, and 190°C at 2000 m depth. These values are 3-5 times higher than the average of the land area in Japan. Mean heat flow between 1000-2000 m depth is about 4 HFU, and 2.5 times higher the average of 1.6 HFU of the land area in Japan. Depth-profile of efficient porosity, depth-profile of core density at natural dray state, core density at enforced wet state, core density at enforced dry state, core elastic wave velocity at enforced wet state were compiled on diagrams. 5 refs., 7 figs.

30840 (ETDE/JP-mf--92562509, pp. 103-114) **Hypothesis on competition of thermal conduction zone and juvenile hydrothermal solution retention zones in the surroundings of magma.** Muraoka, H. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of research and development in Sunshine Project in FY1990.: Kokudo chinetsu shigen hyoka gijutsu ni kansuru kenkyu.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

In the surroundings of silicic magma intrusive bodies, there are two cases of development of contact metamorphosed zone and development of hydrothermal alteration zone of porphyry-type deposit. Their features are in contrast with each other, and the contact metamorphosed zone may result from the thermal conduction process from the magma, and the hydrothermal alteration zone of the porphyry-type deposit may result from the juvenile hydrothermal solution retention process from the magma. on the factors which control the competition of these two phenomena, two hypotheses of permeability hypothesis and two-phase separation curve hypothesis were proposed. The latter is the main factor which controls the competition of these two phenomena, and the former is considered to be subordinate factor. It is considered that if the top of the magma is deeper than about 2.5 kilometers, the zone of contact metamorphism is developed by predominating thermal conduction, arid if the top of the magma shallower than about 2.5 kilometers, the zone of hydrothermal alteration of the porphyry-type deposit is developed by the occurrence of juvenile hydrothermal solution retention. 26 refs., 4 figs.

30841 (ETDE/JP-mf-92562517) **Analysis and evaluation of data from the nationwide survey of geothermal exploration.** Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992 133p. (In Japanese). Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

The present report summarizes outlines of fiscal 1990 researches on the analysis and evaluation of data from the nationwide survey of geothermal exploration, which is promoted as a part of Sunshine Project by Agency of Industrial Science and Technology. The geothermal resource evaluation system is analyzed and evaluated in connection with the integrated processing system which was constructed by New Energy and Industrial Technology Development Organization (NEDO). This report includes the analysis and evaluation of knowledge base and rule and the analysis and evaluation of information network system. On the other hand, the collection of resource evaluation bases in the northern Tohoku district (Akita-koma), the basic mapping for resource evaluation in the southern Tohoku district (Nasu and Bandai), and the collection of resource evaluation bases in the northern Kyushu district (Tsurumi-dake and Aso) have been carried out as the analysis and evaluation model of regional geothermal system. Especially, to construct the resource evaluation map of the 1:500, 000 " Niigata ", a series of edited geological map, tectonic map, prospective geothermal potential distribution map, geothermal exploration well distribution map, thermal spring distribution map, and table of chemical composition of thermal spring waters has been completed. 159 refs., 34 figs., 15 tabs.

30842 (ETDE/JP-mf-92562517, pp. 105-122) **Underground structure and temperature structure of the Aso area obtained from gravity and magnetic analysis.** Okubo, Y. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

In this report, the significance of gravity and magnetic anomaly in the Aso area is investigated using gravity and magnetic data and borehole data for the thermal spring exploration. In order to provide a basis of geothermal resource evaluation, the underground structure and temperature structure have been estimated from the gravity and magnetic analysis. Consequently, it was estimated that the low density beds, such as caldera deposits, become thicker gradually towards the center of caldera since low gravity anomaly is shown within the Aso caldera. It was also found that the Futagawa fault extending to the west of Aso caldera would be a normal fault with a north dip and more than 45°of dip angle. It was suggested that the presence of plate-like magnetic body with high magnetic intensity along the Futagawa fault plane would be derived from the intrusive rocks formed along the fault by the volcanic activity of the Aso volcano. Furthermore. it was considered from the temperature gradients of boreholes for the thermal spring exploration that the temperature would decrease rapidly at the west of caldera wall. 21 refs., 7 figs.

1503 Geothermal Exploration and Exploration Technology

Refer also to citation(s) 30837, 30842, 32009, 32010

30843 (ETDE/JP-mf-92562509, pp. 7-27) **Comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data.** Tamao, S. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resoruce evaluation of Japan.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

The thermal properties of deep parts of 14 main geothermal areas, Kurikoma, downstream area of Dozan-gawa, Okiura, western part of Teshikaga, Yuzawa-Ogachi, Okuaizu, surroundings of Ikeda-ko, Sengan, Kurino-Tearai, Shimokita, northern part of Azuma, western part of Unzen, Minamikayabe, and Toyoha, were clarified by dealing with the existing underground temperature data. The temperature distribution patterns were classified into conduction type and convection type, and by using this result research areas were divided into the conduction area and the convection area. The square measure classified by temperature of each area is estimated from temperature distribution data classified with altitudes, and compared and examined. The areas which have wide deep high temperature zones (above 200°C at −2 km beneath sea level) are Sengan (390 km^2), and Kurikoma, Yuzawa-Ogachi, Toyoha, Kurino-Tearai, and northern part of Azuma (about 100 km^2). Other areas have narrow or no high temperature zones, and are considered to be supplied geothermal solutions by lateral flow. 2 figs., 5 tabs.

1505 Economic, Industrial, and Business Aspects

Refer also to citation(s) 30838

30844 (LA-UR-92-2380) **Industrial applications of hot dry rock geothermal energy.** Duchane, D.V. Los Alamos National Lab., NM (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209147-1: International conference on industrial uses of geothermal energy, Reykjavik (Iceland), 2-4 Sep 1992). Order Number DE92018903. Source: OSTI; NTIS; GPO Dep.

Geothermal resources in the form of naturally occurring hot water or steam have been utilized for many years. While these hydrothermal resources are found in many places, the general case is that the rock at depth is hot, but does not contain significant amounts of mobile fluid. An extremely large amount of geothermal energy is found around the world in this hot dry rock (HDR). Technology has been under development for more than twenty years at the Los Alamos National Laboratory in the United States and elsewhere to develop the technology to extract the geothermal energy from HDR in a form useful for electricity generation, space heating, or industrial processing. HDR technology is especially attractive for industrial applications because of the ubiquitous distribution of the HDR resource and the unique aspects of the process developed to recover it. In the HDR process, as developed at Los Alamos, water is pumped down a well under high pressure to open up natural joints in hot rock and create an artificial geothermal reservoir. Energy is extracted by circulating water through the reservoir. Pressurized hot water is returned to the surface through the production well, and its thermal energy is extracted for practical use. The same water is then recirculated through the system to mine more geothermal heat. Construction of a pilot HDR facility at Fenton Hill, NM, USA, has recently been completed by the Los Alamos National Laboratory. It consists of a large underground reservoir, a surface plant, and the connecting wellbores. This paper describes HDR technology and the current status of the development program. Novel industrial applications of geothermal energy based on the unique characteristics of the HDR energy extraction process are discussed.

1506 Environmental Aspects

Refer also to citation(s) 30853

1507 Products and By-Products

Refer also to citation(s) 30853

1508 Geothermal Power Plants

Refer also to citation(s) 30844

30845 (NEI-DK-909) **Time-continuous dynamic models for heat exchangers.** Eksamensprojekt - IMSOR, 25/89. Palsson, O.P. Technical Univ. of Denmark, Lyngby (Denmark). Inst. of Mathematical and Operations Research. 1989 110p. (In Danish).

Contract ENS-1323/89-14. Order Number DE92562845. Source: OSTI; NTIS.

EFP-89.

The setting up of the time-continuous dynamic models for heat exchangers is based on practical conditions in connection with a cogeneration plant in Iceland which uses geothermal energy in the form of steam at a temperature of 200 degrees centigrade. This steam is used partly to drive electricity generating turbines and partly for heating district heating water via heat exchangers. Statistical methods, such as Kalmanfilter and Maximum Likelihood estimation, are then used for determining the model order, estimation of parameters and verification. The heat exchangers dealt with are the shell and tube counter-current type, and were used to heat fresh water from a lake with the help of geothermal water from boreholes. It is claimed that models based on the assumption that temperature profiles in each section are linear, (using the average as the driving force) give the best results. It is also satisfactory for estimating convection coefficients between the warm mass current and the metal, and between the metal and the cold mass current. Estimates of the convection coefficients could be used to control the cleanliness of the heat exchanger. (AB) (27 refs.).

1509 Geothermal Engineering

30846 (DOE/ID/12934–1) **Stanford Geothermal Program [quarterly technical progress reports, July–September 1990 and October–December 1990].** Stanford Univ., CA (United States). Stanford Geothermal Program. 18 Feb 1991. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG07-90ID12934. Order Number DE92040148. Source: OSTI; NTIS; GPO Dep.

For the summer quarter, progress is summarized and data are presented on the following: well test analysis of finite-conductivity fractures, theoretical investigation of adsorption phenomena, and optimization of reinjection strategy. For the fall quarter, activity focused on the adsorption and well testing projects. A new project investigating reinjection at the Geysers was initiated. (MHR)

30847 (DOE/ID/12934–2) **Stanford Geothermal Program [quarterly technical report, January–March 1991].** Stanford Univ., CA (United States). Stanford Geothermal Program. 13 May 1991. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG07-90ID12934. Order Number DE92040147. Source: OSTI; NTIS; GPO Dep.

Progress was reported on adsorption work in experimental, theoretical and field projects. The reinjection task is now nearing completion of the work on optimizing injection into the Palinpinon geothermal field in the Philippines. Well test analysis research has been expanded with the initiation of a new project on multiwell interference test interpretation.

30848 (DOE/ID/12934–3) **Stanford Geothermal Program [quarterly technical report, April–June 1991; topical report, July 1, 1990–June 30, 1991].** Stanford Univ., CA (United States). Stanford Geothermal Program. 16 Jul 1991. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG07-90ID12934. Order Number DE92040146. Source: OSTI; NTIS; GPO Dep.

The reinjection task on optimizing injection into the Palinpinon geothermal field in the Philippines was completed. Progress is summarized on experimental investigation of absorption, estimation of adsorption parameters from experimental and field data, the theoretical study of adsorption isotherms, and interpreting pressure data. (MHR)

30849 (DOE/ID/12934–4) **Stanford Geothermal Program [quarterly technical report, July–September 1991].** Stanford Univ., CA (United States). Stanford Geothermal Program. 31 Oct 1991. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG07-90ID12934. Order Number DE92040145. Source: OSTI; NTIS; GPO Dep.

Progress for the reporting period is summarized on the following: analyzing multiwell pressure data for a composite reservoir with a circular discontinuity, adsorption theory from the point of view of numerical simulation, effects adsorption/desorption on reinjection and tracer analysis, and estimation of adsorption parameters from experimental and field data. (MHR)

1520 Geothermal Data and Theory

30850 (ETDE/JP-mf–92562509, pp. 129-177) **Temperature gradient map of the Japanese Islands.** Okubo, Y. (Geological Survey of Japan, Tokyo (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

The purpose of this study is to prepare the temperature gradient map of the Japanese Islands from the published data of temperature logging of borings for the geothermal resource development. There are data from 290 borings in 32 geothermal areas. From these data, temperature gradient maps and temperature logging diagrams were prepared, and the average temperature gradient of each area was estimated, and then the temperature gradient map of the Japanese Islands was drawn. As most of borings are shallower than 1,000 m, it is considered that the obtained temperature gradient map will express the temperature structure shallower than 1,000 m from the ground surface, The temperature gradient in the back are side is higher than that in the fore arc side, and it reaches 2-l0°C/l00 m or more. The temperature gradient in the fore arc side is in the order of l-3°C/l00 m. The region where the temperature gradient is over 10°C/l00 m corresponds to active volcanic regions, and the area where the temperature gradient is over 5°C/100 m corresponds to Quaternary volcanic regions. 9 refs., 32 figs., 3 tabs.

30851 (ETDE/JP-mf–92562517, pp. 7-33) **Analysis and evaluation of knowledge base and rule. Part 1.: Geochemical classification and significance of original water relating to geothermal system.** Noda, T. (Geological Survey of Japan, Tsukuba (Japan)); Takahashi, M. Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

This report describes the introduction of a concept of fluid flow block and its significance in the integrated processing system for extracting prospective geothermal potential regions. It also describes the introduction of a concept of original water relating to geothermal system, which is a basic element for analyzing fluid flow, the geothermal classification of original waters, and its significance. The flow for geothermal system model construction was divided into four blocks, i.e., thermal structure block, material property block, fluid flow block, and integration block. On the other hand, the original waters were classified on the basis of the combinations of origins into eleven kinds, i.e., deep hot water, sea water-related hot water, geothermal area-related water, volcanic gas injected water, two types of steam heated waters, altered zone-related water, deep seam hot water, sea water, low temperature altered sea water, and surface water. It was provided that the two-dimensional fluid flow vector can be made through the integration of the concept of original water and the weighted linear regression method for the fluid flow blocks in the integrated processing system. 72 refs., 6 figs., 6 tabs.

30852 (ETDE/JP-mf–92562517, pp. 37-47) **Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan).** Noro, H. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

In this report, the usual method for determination of class division in the case of making histograms is described and applied to the data of chlorine ion concentrations in the thermal spring waters in Japan. Additionally, an advanced method from the conventional method has been developed and examined. Firstly, 858 samples were illustrated in the iso-interval integrated optimization histogram. Next, to improve the insufficiency of this histogram, a histogram model using an aniso-interval integration method has been developed. Furthermore, an evaluation method using the bootstrap method has been also developed as a method for estimating reliability of the histogram. For the bootstrap method, the dispersion of frequency in each class of histogram can be evaluated, for example, by the sample dispersion. Consequently, it was verified that there would almost certainly be the two-crests distribution which was recognized in the original data. 5 refs., 6 figs., 3 tabs.

1540 Waste Management

30853 (BNL–47156) **Developments in geothermal waste treatment biotechnology.** Premuzic, E.T.; Lin, M.S.; Jin, J.Z. Brookhaven National Lab., Upton, NY (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9209147–2: International conference on industrial uses of geothermal energy, Reykjavik (Iceland), 2-4 Sep 1992). Order Number DE92019368. Source: OSTI; NTIS; GPO Dep.

Disposal of toxic solid waste in an environmentally and economically acceptable way may be in some cases a major impediment to large geothermal development. The major thrust of the R&D effort in this laboratory is to develop low-cost processes for the concentration and removal of toxic materials and metals from geothermal residues. In order to accomplish this, biochemical processes elaborated by certain microorganisms which live in extreme environments have served as models for a biotechnology. It has been shown that 80% or better removal of toxic metals can be achieved at fast rates (e.g., 25 hours or less) at acidic pH and temperatures of about 60°C. There are several process variables which have to be taken into consideration in the development of such biotechnology. These include reactor size and type, strain of microorganisms, biomass growth, temperature, loading concentrations of residual geothermal sludge, and chemical nature of metal salts present. Recent data generated by the research and development effort associated with the emerging biotechnology will be presented and discussed.

17 WIND ENERGY

30854 (NUTEK-B–92-2) **IEA wind energy.: Annual report 1991.** Pershagen, B. (ed.) (NUWEC, Nykoeping (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Jan 1992. 140p. Order Number DE92563024. Source: OSTI; NTIS.

The report reviews the progress during 1991 in the Agreement for Cooperation in the Research and Development of Wind Turbine Systems (IEA R and D Wind), operated under the auspices of the International Energy Agency (IEA). IEA R and D Wind is an agreement for carrying out joint research, development and demonstration projects. Since 1 January 1991, the activity also includes the exchange of information on the planning and execution of national programmes for the design, construction, operation and evaluation of large-scale wind turbines with a rated power of approximately 1 MW or more.

1701 Resources and Availability (Climatology)

30855 (NUTEK-VIND–92-3) **Wind energy calculations for Swedish coastal water conditions. Report nr 3.** Backstroem, H. (Swedish Meteorological and Hydrological Inst., Norrkoeping (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1991. 47p. (In Swedish). Project NUTEK-506-250. Order Number DE92563021. Source: OSTI; NTIS.

A method for calculation of the wind speed in the boundary layer, 0-1400 m, have been developed. It is based on the Monin-Obukhov similarity theory. The metod have been used to calculate available wind energy at the 100 m level above the sea. Comparative calculations with an empirical method and a few actual measurements, indicate that the method gives too high wind speeds at 100 m. The calculations shows that the wind energy is higher at the west coast than at the east coast. There is also a north-south gradient with inreasing wind energy to the south. In offshore sites of special interest, actual measurements should be performed to give further information concerning the wind speed.

1706 Wind Energy Engineering

30856 (AUC-IBT-R–9119) **Fatigue tests on glued laminated wood beams: Partial report 4: Testing of series C.** Pilegaard Hansen, L.; Rathkjen, A. Aalborg Universitetscenter (Denmark). Inst. for Bygningsteknik. Jun 1991. 43p. (In Danish). Contract TR-88.1040;Contract ENS-51171-91.0004. Order Number DE92562848. Source: OSTI; NTIS.

A total of 206 glued laminated wood beams have been tested in fatigue. The beams all had a test length of 2000 mm while the cross sections were slightly different in the 13 series, width by height were equal to 62 x 133.60 x 121.60 x 120 and 65 x 120 mm respectively. Except for 10 beams of Thuja plicata, all beams were made of spruce. The laminas were either parallel with the beam axis or inclined 1:20, 1:10 or 1:5 with the axis. All beams were tested in four point bending. One or two from each series were statically loaded, the rest were dynamically loaded with a harmonic load at a frequency of 10 Hz. The load was applied in such a way that the deflection varied between 3 mm and 13 to 26 mm. The beams had a moisture content of approximately 12%. In the statical tests corresponding values of force and deflection were measured. During the fatigue tests maximum and minimum values of the forces were measured, and the number of cycles were counted. (Author).

30857 (NEI-DK–903) **Matching asynchronous generators to small windmills.** Castellani, R. Nordvestjysk Folkecenter for Vedvarende Energi, Hurup (Denmark). Feb 1992 35p. Order Number DE92562881. Source: OSTI; NTIS.

The aim was to discover the practical usage of standard asynchronous motors directly driven in small windmills for electric heating and for battery charging. These could take the place of the more expensive and specially designed generators normally used in wind turbines and thus could be interesting for developing countries. Testing took place on a lathe with an arm system fixed to the motor for the torque measurements which were used for the calculations related to the power on the shaft (Pin). Spring dynamometers, digital and analogic pointer instruments were made use of. The three phase water resistor (three electrodes with a device for adjusting their sinking in water) was used as a variable and pure resistive load. It is stated that the asynchronous machines are reliable, relatively inexpensive and can be purchased all over the world. They are also highly efficient. (AB).

30858 (NEI-DK–916) **Slow-running permanent magnetic generators for wind power etc. 1.5-100 kW: Calculations and draft.** Rasmussen, P.; Vilsboell, N. Nordvestjysk Folkecenter for Vedvarende Energi, Hurup (Denmark). Jan 1992 69p. (In Danish). Contract ENS-UVE-90.0056. Order Number DE92562862. Source: OSTI; NTIS.

Cover titel: Beregninger og skitser af Langsomtloebende permanent magnetisrede generatorer til vindkraft mv.v. 1,5-100 kW.

The technical and economical potentials for the construction of permanent magnetic generators for wind power have been examined through a perusal of relevant literature. The generator has many poles, with a low number of rotations, which are directly mounted on the generator shaft in order to avoid increase of speed in a gear box. A supplementary calculation programme relative to a 100 kW permanent magnetic generator and developed by The Technical University of Denmark was also examined and is described. It was concluded that the two most important conditions to be considered when constructing a many-poled permanent magnetic generator is the loss of voltage and the start moment when originally standing still. The loss of voltage could be caused by a phenomenon named "zigzag reactance" which does not have any influence on fast speed engines and generators. The loss of voltage is limited by increasing the amount of slots and by optimizing their shape. The moment of starting is limited partly by using a partial fraction slot, so that there is no symmetry between the stator and rotor poles, and partly by limiting the loss of voltage by using many slots with optimized shape. The current price of a 20 kW permanent magnetic generator would be ca. 165,000 DKK, inclusive of power conversion for grid connection which amounts to 50,000 DKK. Otherwise the construction principles of this form of generator follows the current principles of traditional electric motors and generators. (AB).

30859 (NUTEK-VIND–92-4) **Linear quadratic control of variable speed wind turbines below rated power.** Ekelund, T. (Chalmers Univ. of Technology, Goeteborg (SE). School of Electrical and Computer Engineering); Schmidtbauer, B. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden); Chalmers Univ. of Technology, Goeteborg (Sweden). School of Electrical Engineering. Apr 1992. 36p. Project NUTEK-506-258. (CTH-RT-R–92-4). Order Number DE92563071. Source: OSTI; NTIS.

Variable speed wind turbines have the potential advantage of increasing the energy capture when operated below rated power. This report investigates the trade off between the objectives of keeping optimal tip speed ratio and minimizing the dynamic loads of the system. Linear quadratic optimal control methods are used to quantify this balance. Three models of different degree of complexity are compared, and proved to have similar behaviour. The controllers have been simulated with non-linear aerodynamic torque, and the simulation confirmed the predicted characteristics. It is also shown that the systems are robust to parameter changes even when the model used in the controller design is of lower order than the true system. 33 figs.

30860 (NUTEK-VIND–92-7) **Investigation of an electrical converter system with an induction generator for variable speed operation of a wind turbine.** Halleroed, P.; Karlsson, B. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden); Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Electical Machines and Power Electronics. Apr 1992. 81p. Project NUTEK-506-258. (CTH-E–92-03). Order Number DE92563072. Source: OSTI; NTIS.

This report mainly deals with the electrical system of a wind project carried out at the Department of Electrical Machines and Power Electronics. The system is a variable speed system with stall control of the turbine and the rated power of 35 kW. The system is described thoroughly, especially regarding the induction generator and the electrical conversion system consisting of two AC/DC converters and one DC/DC converter. The control of the system is only discussed briefly. A number of measurements have been carried out in a laboratory environment to establish the performance and limits of the system. Some measurements of interest are step-response tests, establishing the equivalent circuit and the efficiency of the system. A few modifications have also been carried out, for example in the internal control of the converters. 10 refs., 50 figs., 4 tabs.

30861 (RISO-R–615) **The cup anemometer and other exciting instruments.** Kristensen, L. Risoe National Lab., Roskilde (Denmark). Meteorology and Wind Energy. Apr 1992. 83p. Order Number DE92562859. Source: OSTI; NTIS.

Nonlinear sensor dynamics is discussed in terms of differential equations in time with the input signal and the response as dependent variables. The cup anemometer response to the turbulent wind is analyzed in detail. Applying second-order perturbation theory, the so-called overspeeding, which is a bias in the measured mean wind speed due to fluctuations in the longitudinal wind component, is evaluated in terms of a phenomenological model of the wind forcing of the cup rotor. It is shown how the fluctuation in the other wind components give rise to three other types of bias and it is concluded that the positive bias in the mean wind speed due to wind-direction fluctuations is always largest and much larger than the overspeeding and can be as much as 18% whereas the overspeeding only in extreme cases exceeds about 2%. The differential equation describing the cup-anemometer dynamics of only first order. However, the technique of evaluating the bias on the mean is generalized to apply to sensors with nonlinear dynamics and obeying second-order differential equations. It is then demonstrated how the bias in the mean due to random fluctuations can be determined for three other sensor, namely the Pitot tube, the thrust anemometer and the CSIRO liquid water probe. The last instrument will always have a negative bias. Returning to the discussion of the cup anemometer, it is shown how this instrument can be used together with a wind vane to reduce the bias due to wind direction fluctuations. Finally it is discussed how a precise definition of a gust can be implemented and how gusts can be determined by means of a cup anemometer. (au) (17 ills., 55 refs.).

30862 (SAND–91-2228) **Measured data for the Sandia 34-meter vertical axis wind turbine.** Ashwill, T.D. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 119p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019807. Source: OSTI; NTIS; GPO Dep.

The 34-meter Test Bed is a research-oriented, variable-speed vertical-axis wind turbine located at the USDA Agricultural Research Station in Bushland, Texas. Sandia National Laboratories designed and built this machine to perform research in structural dynamics, aerodynamics, and fatigue. Testing to determine its performance in various wind conditions and rotation rates has been ongoing for over three years. This report documents a broad range of test data and includes comparisons to analytical results.

20 FOSSIL-FUELED POWER PLANTS

2001 Power Plants and Power Generation

Refer also to citation(s) 30543, 30545, 30546, 30547, 31408

30863 (NEI-FI–169) **The design and dimensioning of insulation in power plants and boilers.** Partek Oy Ab, Helsinki (Finland). 1989. 139p. (In Finnish). Order Number DE92562900. Source: OSTI; NTIS.

As a result with written inquiry for the power plants in Finland there was a clear view found over the planning of insulations, dimensioning, thicknes: of insulation, insulation materials, reparations and the volume of insulations. In this publication there are produced rules for insulation in power plants and a guidance for insulation work in boilers, pipes, turbines and precipitators and recommendations of materials. Incorporated with these rules there many detailed drawings on insulation are shown. Based on this information there is a possibility to get a new standard for insulation in power plants or an enlargement for SFS 3978.2 standard.

2002 Waste Management

Refer also to citation(s) 30475, 30476, 30477, 30478, 30479, 30480, 30481, 30482, 30484, 30485, 30486, 31668

30864 (DOE/PC/90309–7) **Anion-exchange resin-based desulfurization process: Quarterly technical progress report, April 1, 1992–June 30, 1992.** Sheth, A.C.; Strevel, S.D.; Dharmapurikar, R. Tennessee Univ., Tullahoma, TN (United States). Space Inst. [1992]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90309. Order Number DE92019676. Source: OSTI; NTIS; GPO Dep.

The University of Tennessee Space Institute (UTSI) has contracted to further develop its anion-exchange, resin-based desulfurization concept to desulfurize alkali metal sulfates. From environmental as well as economic viewpoints, it is necessary to remove soluble sulfates from the wastes created by flue gas desulfudization systems. In order to do this economically, a low-cost desulfurization process for spent sorbents is necessary. UTSI's anion exchange resin-based desulfudization concept is believed to satisfy these requirements. We have nearly completed the process variables study in which we have evaluated the effects of seven major process variables. At present, we are analyzing the data using the fixed bed math model used in our earlier study. We have also initiated the batch mode resin regeneration experiments to identity optimum conditions for the fixed bed regeneration. Similarly, we are also continuing with our efforts to determine the trade-off between the solution concentration and the evaporation/concentration load.

30865 (DOE/PC/90550–T6) **Integrated dry NO_x/SO_2 emissions control system: Quarterly report No. 5, January 1–March 31, 1992.** Public Service Co. of Colorado, Denver, CO (United States). 15 May 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-91PC90550. Order Number DE92019717. Source: OSTI; NTIS; GPO Dep.

The DSI system design is approximately eighty percent completed. About eighty percent of the materials have been purchased for erection and setup of the DSI system. Most of the equipment and supply purchases have been made for the DCS. The Unit 4 outage started March 20, 1992 for the installation of the remaining project equipment. overall field construction activities continued on the flyash, boiler, dry sorbent injection and humidification systems. Noell performed startup and testing activities for the urea injection system. FERCO completed baseline urea injection tests March 6, 1992. Preliminary analyses were reviewed at a project review meeting on March 11, 1992. The HVAC platform and duct work for the DCS was installed. B&W mobilized on site. Demolition and construction activities began to support the future installation of the low NO, burners and ports. CSM completed the batch reactor vessel. The sorbent and flyash silos were erected for the DSI system. The humidification building was erected and piping for the fly ash silo started.

30866 (LA-UR–92-2391) **A preliminary study of the effect of equivalence ratio on a low emissions gas turbine combustor using KIVA-II.** Yang, S.L. (Michigan Technological Univ., Houghton, MI (United States)); Chen, R.; Cline, M.C. Los Alamos National Lab., NM (United States). [1992]. 12p. Sponsored by Department of Defense, Washington, DC (United States); National Aeronautics and Space Administration, Washington, DC (United States). DOE Contract W-7405-ENG-36. Contract NAG3-1109;Contract C-30050-R. (CONF-921110–14: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92018616. Source: OSTI; NTIS; GPO Dep.

Staged turbine combustor (STC) concept has drawn more and more attention since late 70's because of its potential in reducing pollutant emissions while high power output is required. In this project, a numerical study is performed to investigate the chemically reactive flow with sprays inside a STC combustor using a modified version of the KIVA-II code. This STC combustor consists of a fuel nozzle (FN), a rich-burn (RB) zone, a converging connecting section, a quick-quench (QQ) zone, a diverging connecting section, and a lean-combustion (LC) zone. An advanced airblast fuel nozzle, which has two fuel injection passages and four air flow passages for providing swirl, is used in this study. The effect of the equivalence ratio ϕ on the performance of the STC combustor is reported in this paper for ϕ range of 1.2 to 2.0. Preliminary results reveal some major features of the flow and temperature fields inside the STC combustor. Distributions of velocity, temperature, and some critical species information inside the FN/RB zone illustrate the effect of phi on the flame temperature and the NO_x formation in rich burning. The co- and counter-rotating bulk flow, and the sandwiched-ring-shape temperature field in the QQ/LC zone, typical of the confined inclined jet-in-cross flow, are clearly shown from the computation. The predicted mass-weighted standard deviation and the pattern factor of temperature show that the mixing performance of the STC combustor is very good. The temperature of the fluid leaving the LC zone is very uniform. As expected. lower value of the emission index of NO can be achieved with larger value of ϕ. Prediction of the NO_x emission shows that there is no excessive thermal NO_x produced in the QQ/LC zone for all the cases studied.

30867 (LUTKDH-TKKT–1020-1-179-92) **Prospects for further development of spray-dry scrubbing.** Stroemberg, A.M. Lund Univ. (Sweden). Dept. of Chemical Engineering II, Chemical Center. 1992. 53p. Order Number DE92563062. Source: OSTI; NTIS.

The work presented in this thesis has dealt with three areas related to spray-dry scrubbing of flue gases, namely the use of limestone in spray-dry scrubbing, simultaneous removal of SO_2 and NO_x in spray-dry scrubbing, and oxidation of sulfite in the dry end product from spray-dry scrubbing. Starting with the conventional lime based spray-dry scrubbing process, the prospects for further development of this process were investigated. The investigations were carried out mainly in a sandbed reactor, in a bench-scale spray-dry scrubber, and in a pilot plant spray-dry scrubber. Studies of SO_2 removal with lime and limestone under bagfilter conditions revealed many similarities between the two sorbents, such as the sorbent utilization and the sorption capacity at different relative humidities if data were related to the BET surface area. A reaction mechanism of the dry reactions is presented. The study of simultaneous removal of SO_2 and NO_x included screening tests of sorbent candidates for simultaneous SO_2/NO_x removal. More thorough investigations were made with two of the most promising candidates, i.e., urea and sodium chloride, as additives to lime or limestone. Urea showed a great impact on SO_2 removal in the pilot plant, but NO_x removal was only moderately affected by the urea addition. The addition of sodium chlorite to both lime and limestone increased the removal of both SO_2 and NO_x tremendously, producing a relatively harmless end product. Reaction mechanisms and economy for the different concepts are discussed. Studies of the sulfite oxidation of the spray-dry scrubbing product were carried out thermally at elevated temperatures and in a slurry at moderate temperatures. The rate-determining step in slurry oxidation proved to be oxygen transfer to the liquid with simultaneous reaction. 37 refs., 17 figs., 2 tabs.

30868 (RVF–92-2) **NO_x reducing measures at five Swedish waste incineration plants.** Maardsjoe, O. (ECOHEAT AB (SE)). Svenska Renhaallningsverksfoereningen, Malmoe (Sweden). Jan 1992. 36p. (In Swedish). Order Number DE92563034. Source: OSTI; NTIS.

Five Swedish plants are compared, two of which have installed modifications to the combustion chambers, and three plants secondary measures only. The primary measures (reburning) were inexpensive and gave increased efficiency and reduced wear. The emission reduction amounts to 30-50 %. The secondary measures (urea injection) were more expensive and increased the operational costs. An emission reduction of 50-70 % seems to be possible without too much ammonia slip. A combination of primary and secondary measures have good prospects for giving still lower NO_x emissions, perhaps by 70-80 %.

21 NUCLEAR POWER REACTORS AND ASSOCIATED PLANTS

Refer also to citation(s) 31048

2101 Power Reactors, Nonbreeding, Light-Water Moderated, Boiling Water Cooled

Refer also to citation(s) 30642, 30919, 30921, 30962, 31003, 31009, 31012, 31015, 31018, 31019, 31020, 31021, 31022, 31023, 31025, 31026, 31031, 31325, 31335, 31336, 31340

30869 (DOE/RW–0184-R1-Vol.1) **Characteristics of potential repository wastes: Volume 1.** Oak Ridge National Lab., TN (United States). Jul 1992. 320p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–2217-Vol.1). Source: INIS; OSTI (Free of Charge).

This document, and its associated appendices and microcomputer (PC) data bases, constitutes the reference OCRWM data base of physical and radiological characteristics data of radioactive wastes. This Characteristics Data Base (CDB) system includes data on spent nuclear fuel and high-level waste (HLW), which clearly require geologic disposal, and other wastes which may require long-term isolation, such as sealed radioisotope sources. The data base system was developed for OCRWM by the CDB Project at Oak Ridge National Laboratory. Various principal or official sources of these data provided primary information to the CDB Project which then used the ORIGEN2 computer code to calculate radiological properties. The data have been qualified by an OCRWM-sponsored peer review as suitable for quality-affecting work meeting the requirements of OCRWM's Quality Assurance Program. The wastes characterized in this report include: light-water reactor (LWR) spent fuel and immobilized HLW.

30870 (INIS-mf–14080) **Kernkraftwerk Lingen GmbH: Safe enclosure. Annual report 1991.** Kernkraftwerk Lingen GmbH (Germany). [1992] 28p. (In German). Order Number DE93702242. Source: OSTI; NTIS (US Sales Only); INIS.

The report deals with 1. operation of SE (general aspects, maintenance, recurring tests, peculiarities); 2. monitoring of operation (temperature measurement, measurement of humidity, ventilation condensate, sump monitoring); 3. radiological data (personnel surveillance, aerosal activitiy, radioactive release with circulating and waste air, radioactive release via the waste water path, radon monitoring in SE, control of surroundings, radioactive wastes). (orig.).

30871 (JAERI-M–92-012, pp. 62-78) **Activities of the Commission of the European Communities in the area of iodine chemistry in severe reactor accidents.** Benson, C.G. (Commission of the European Communities, Ispra (Italy). Joint Research Centre); Drossinos, Y.; Van Rij, H.M. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The principal activities of the Commission of the European Communities (CEC) in the area of iodine chemistry in severe nuclear reactor accidents are reviewed. These are mainly carried out in conjunction with partner organizations as part of a programme of Shared Cost Actions. Fundamental thermochemical data have been measured and assessed for a number of compounds or systems of importance in predicting the behaviour of fission products in the primary circuit. The Falcon programme of integral and separate-effects experiments has examined the transport and deposition of fission products under reasonably representative accident conditions, with particular emphasis on containment iodine chemistry. The most important activity is through involvement with the Phebus-FP programme of in-pile integral tests, which will involve detailed examination of the fuel bundle, primary circuit, and containment phenomena. These experiments will be modelled using various computer codes. The development of an integrated European severe accident code package (ESTER) is also supported. (author).

30872 (JAERI-M–92-012, pp. 165-180) **The kinetics of reaction between iodine vapour and bulk-material aerosols.** Bowsher, B.R. (AEA Technology, Winfrith (United Kingdom)); Newland, M.S.; Henshaw, J. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Bulk materials within the reactor core such as Ag-In-Cd control rod and boric acid could generate an aerosol concentration greater than 1 g m^{-3} during a severe accident. The surface area of these aerosols could be approximately 500 x greater than the total internal surface area of the primary circuit, implying that vapour-aerosol interaction mechanisms could dominate the transport of the fission products released from the damaged fuel. However, only limited studies have been undertaken to quantify such interactions, and models to describe all potential interactions are not currently available within the relevant computer programs (eg VICTORIA). Thermogravimetric experiments have been conducted to follow the interaction of iodine vapour with aerosol substrates as functions of temperature, flow velocity and vapour pressure. The reaction of iodine vapour with silver or cadmium substrates is limited by either mass transfer of iodine molecules from the gas phase (resulting in linear reaction rates) or diffusion through the product layer (resulting in parabolic reaction kinetics). (author).

30873 (JAERI-M–92-012, pp. 364-380) **Validation of the IODE code on analytical experiments.** Hueber, C. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint Paul lez Durance (France). Inst. de Protection et de Surete Nucleaire); Lucas, M.; Gauvain, J. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The ESCADRE system is a set of computer codes dedicated to realistic source term assessments in the case of water reactor severe accidents. In this system the IODE code is developed to the containment iodine physico-chemistry. In the frame of iodine chemistry, a small scale experimental programme has been performed in CEA. Solutions of CsI or KIO_3 were submitted to γ irradiation at two temperatures 43degC, 95degC and various pH. The paper is focused on the validation of IODE using the experimental results of this small scale programme. Three types of experiments are described and for each of them the following items are presented: Modelling adopted, Description of the calculated results for a typical case, Comparisons of measurements and calculation for several experiments. (author).

30874 (JAERI-M–92-012, pp. 414-430) **Iodine chemical forms in LWR severe accidents.** Weber, C.F. (Oak Ridge National Lab., TN (United States)); Beahm, E.C.; Kress, T.S. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Calculated data from seven severe accident sequences in light-water-reactor plants were used to assess the chemical forms of iodine in containment. In most of the calculations for the seven sequences, iodine entering containment from the reactor coolant system was almost entirely in the form of CsI with very small contributions of I or HI. The largest fraction of iodine in forms other than CsI was a total of 3.2 % as I plus HI. Within the containment, the CsI will deposit onto walls and other surfaces, as well as in water pools, largely in the form of iodine (I^-). The radiation-induced conversion of I^- in water pools into I_2 is strongly dependent on pH. In systems where the pH was controlled above 7, little additional elemental iodine would be produced in the containment atmosphere. When the pH falls below 7, it may be assumed that it is not being controlled and large fractions of iodine as I_2 within the containment atmosphere may be produced. (author).

30875 (JAERI-M–92-012, pp. 463-472) **Analysis of iodine source term from a small BWR during a postulated severe accident using IMPAIR 2/M code.** Guentay, S. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)); Raguin, M. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The iodine source term expected to occur during a postulated severe accident is analyzed for a small (1000 MWt) Boiling Water Reactor. The accident was assumed to be initiated as a result of an anticipated transient with scram. The IMPAIR 2/M code which essentially employs the IMPAIR 2 code chemistry to the LWR containments modelled with multiple compartments is used for the analyses. The thermal-hydraulics, aerosol behavior, source term of various iodine species and the dose rates required for the IMPAIR 2/M analyses are calculated with other computer programs. This paper introduces IMPAIR 2/M code and presents the capabilities of the code in predicting iodine behavior in postulated severe accident in a BWR, especially in the wetwell. (author).

30876 (JAERI-M–92-012, pp. 489-502) **A new chemical model for the removal of iodine vapour from a reactor containment by aqueous sprays.** Burns, W.G. (UKAEA Harwell Lab. (United Kingdom)); Goodall, J.A.B. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

This paper describes methods for the calculation of the removal rate of I_2 vapour by aqueous sprays from a large volume such as a reactor containment. The kinetic methods used involve the latest information on the reaction of dissolved iodine with water which causes the I_2 molecules to be quickly transformed into virtually involatile products. This hydrolysis increases the effective waterside mass transfer coefficient of I_2, and depends on the I_2 concentration, the acidity of the water and the temperature. Comparisons of calculated removal rates with a range of suitable experimental data show that for agreement with observation the hydrolysis product HOI, hypoiodous acid, must be considered effectively involatile. When the water is alkaline (pH 9) the overall mass transfer coefficient for I_2 can be put equal to that for the gas side. Acidic sprays can cause a major uptake of iodine by painted walls. (author).

30877 (NUREG/CR–5779-Vol.1) **Aging of non-power-cycle heat exchangers used in nuclear power plants: Operating experience and failure identification: Volume 1.** Moyers, J.C. (Oak Ridge National Lab., TN (United States)). Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Oak Ridge National Lab., TN (United States). Jul 1992. 60p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL–6687-Vol.1). Source: OSTI; NTIS; INIS; GPO.

This report presents the results of an assessment of the time-related degradation of non-power-cycle heat exchangers used in nuclear power plants. The assessment was sponsored by the US Nuclear Regulatory Commission's Nuclear Plant Aging Research Program. Heat exchanger design characteristics and applications in the plants are described and stressors leading to degradation are identified. Operating experience, as identified from nuclear industry data bases, is reviewed and failure types and causes are summarized. Regulatory requirements for inspection and testing, with a brief discussion of industry practices in this area, are presented.

30878 (NUREG/CR–5891) **Accelerated irradiation test of gundremmingen reactor vessel trepan material.** Hawthorne, J.R. (Materials Engineering Associates, Inc., Lanham, MD (United States)). Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Materials Engineering Associates, Inc., Lanham, MD (United States). Aug 1992. 73p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). (MEA–2468). Source: OSTI; NTIS; INIS; GPO.

Initial mechanical properties tests of beltline trepanned from the decommissioned KRB-A pressure vessel and archive material irradiated in the UBR test reactor revealed a major anomaly in relative radiation embrittlement sensitivity. Poor correspondence of material behavior in test vs. power reactor environments was observed for the weak test orientation (ASTL C-L) whereas correspondence was good for the strong orientation (ASTM C-L). To resolve the anomaly directly, Charpy-V specimens from a low (essentially-nil) fluence region of the vessel were irradiated together with archive material at 279°C in the UBR test reactor. Properties tests before UBR irradiation revealed a significant difference in 41-J transition temperature and upper shelf energy level between the materials. However, the materials exhibited essentially the same radiation embrittlement sensitivity (both orientations), proving that the anomaly is not due to a basic difference in material irradiation resistances. Possible causes of the original anomaly and the significance to NRC Regulatory Guide 1.99 are discussed.

30879 (YJT–92-03) **Spent fuel characteristics for TVO-92 safety analysis.** Anttila, M. (Technical Research Centre of Finland, Espoo (Finland). Nuclear Engineering Lab.). Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland). Feb 1992. 36p. (In Finnish). Order Number DE93602088. Source: OSTI; NTIS; INIS.

The composition and radioactive properties of the BWR spent fuel have been calculated with the ORIGEN2 computer code (version 2.1. the BWRUE cross section library). Two cases were studied. In the basic case the initial enrichment of 3.3 wt% and the discharge burnup of 36 MWd/kgU were assumed. For the comparison, another case with the initial enrichment of 3.8 wt% and with the discharge burnup of 45 MWd/kgU was calculated. In the tables and figures of the report presents the results, which are of greatest importance from the point of safety studies of final disposal. Finally, the uranium and plutonium concentrations of the ORIGEN2 calculations are compared with those predicted by the fuel assembly burnup code CASMO. The comparisons indicate that ORIGEN2 has a tendency to predict too high transuranium concentrations, which results in an overestimation of the actinide decay heat by at least 20 %. Therefore, the estimated total decay heat of the spent fuel is too high at the cooling times, which is important from the point of final disposal.

2102 Power Reactors, Nonbreeding, Light-Water Moderated, Nonboiling Water Cooled

Refer also to citation(s) 30642, 30869, 30871, 30872, 30873, 30874, 30876, 30877, 30919, 30921, 30959, 30961, 30998, 30999, 31001, 31008, 31009, 31012, 31015, 31018, 31019, 31020, 31022, 31025, 31335, 31336, 31340

30880 (CNIC–00331) **Comprehensive research on sealing behaviour of reactor vessel of 300 MWe nuclear power plant.** Qu Jiadi (Shanghai Nuclear Engineering Research and Development Inst., SH (China)); Sheng Xianke; Dou Yikang. China Nuclear Information Centre, Beijing, BJ (China). Nov 1989. 15p. (In Chinese). (NERDI–0012.). Order Number DE93602092. Source: OSTI; NTIS (US Sales Only); INIS.

The general conception of a special research on sealing behaviour of PWR vessel is described and the major results centering on the establishment of sealing analysis program system and its experimental verification, along with the description on the development and measurement of sealing ring, the thermal sealing test and the relevant analysis are given. On the basis of the above approach, the vessel sealing behaviours of 300 MWe Qinshan Nuclear Power Plant are evaluated. A concept on the classification of pressure vessels and their sealing criteria are proposed. Two viewpoints on the analysis are suggested, which are that the vessel sealing deformation analysis should be regarded as a basis of the general stress analysis and that bolt loading increment caused by the bolt temperature lag should be taken as a key point when considering the thermo-contact coupling in transient sealing analysis. The understanding about the sealing mechanism are expounded and the thermal equivalent of hydrostatic test is discussed.

30881 (CNIC–00340) **The in-pile proving test for fuel assembly of Qinshan nuclear power plant.** Chen Dianshan (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Zhang Shucheng; Kang Rixin; Wang Huarong; Chen Guanghan. China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 10p. (In Chinese). (IAE–0067.). Order Number DE93602093. Source: OSTI; NTIS (US Sales Only); INIS.

The in-pile proving test for fuel assembly of Qinshan nuclear power plant had been conducted in the experimental loop of HWRR at IAE (Institute of Atomic Energy) in Beijing, China, from January 1985 to December 1986. Average burnup of 27000 MWd/tU and peak burnup of 34000 MWd/tU of fuel rod had already been reached. The basic status of the experiment are described, emphasis is placed on the discussion of proving test parameters and analysis of experiment results.

30882 (CNIC–00343) **Analysis and evaluation of the in-pile irradiation test of the fuel element for Qinshan Nuclear Power Plant.** Song Wenhui (Shanghai Nuclear Engineering Research and Development Inst., SH (China)). China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 10p. (In Chinese). (NERDI–0013.). Order Number DE93602094. Source: OSTI; NTIS (US Sales Only); INIS.

In order to verify in-pile performances of the fuel element for Qinshan Nuclear Power Plant, the comprehensive in-pile irradiation test of a 3 x 3 - 2 mock fuel element was performed in the Heavy Water Experimental Reactor. Some technical problems and test parameters which have influence on the test results were analyzed in more detail to fully prove that the test is of actual significance. The element was tested under the conditions corresponding to the normal and abnormal conditions of Qinshan NPP. The maximum burnup of the test fuel rods reached 34 GWd/tU and the maximum heat flux of the rods was 1.39 MW/m^2. The fuel rods didn't fail in the course of test. Finally the test results were evaluated in verifying the performances of the fuel element and its safe operation in Qinshan NPP.

30883 (CNIC–00347) **Manufacturing technology of top nozzle and bottom nozzle in fuel assembly for nuclear power plant.** Wan Longfu (Yibin Nuclear Fuel Element Plant, SC (China)).

China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 7p. (In Chinese). (NFE–0004.). Order Number DE93602096. Source: OSTI; NTIS (US Sales Only); INIS.

The machining and heat treatment technologies, as well as selected machines, tools and clamping apparatus etc. for manufacture of top- and bottomnozzles in fuel assemblies for Qinshan 300 MW Nuclear Power Plant are presented.

30884 (CNIC–00362) **A whole reactor model hydraulic test for Qinshan nuclear power plant.** Tian Jian (Shanghai Nuclear Engineering Research and Development Inst., SH (China)); Zhang Longgen; Hong Zhongyuan; Liu Shulin; Ju Shixiao; Shen Qingping; Zhu Weiyin. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 12p. (In Chinese). (NERDI–0012.). Order Number DE93602097. Source: OSTI; NTIS (US Sales Only); INIS.

By applying the similar principle a whole hydraulic test model which is to meet the engineering requirement on the scale of 1:5 is designed. The geometry of the core and upper plenum have been carefully studied. After engineering analysis and considering the relations between Euler criteria E_u and Reynolds criteria R_e, the E_u number of the model (drag coefficient) can be equalled with the prototype, if the value of R_e number is equal to self-similar R_e number (In the model the R_e number is 10^5 which is sufficient to ensure self-similar.). The core is composed of modelling fuel assemblies in which the drag coefficient of the prototype is simulated. The assemblies are made of square cross section aluminum bars with a concentric flow channel. The numbers and the arrangement of simulated fuel assemblies are same as the prototype. It ensures the model flow distribution data corresponding to the prototype. Before the testing every simulated fuel assembly is calibrated in accordance with the drag coefficient equalling to the prototype. The tests of two flow distribution plates with solid ratio 0.438 and 0.7 for engineering design have been performed. The core flow distribution is measured and normalized. The drag coefficient of various components in the model from the reactor inlet via core to upper plenum outlet are measured. The testing analysis and comparison show that the flow distribution plate with solid ratio of 0.7 is more preferable. Its flow distribution corresponds to lower plenum subfactor 1.05. This value is identical with engineering specified and in good agreement with other results.

30885 (CNIC–00365) **Using helium mass-spectrometer leak detector to detect the leak of vaporizer in Qinshan nuclear power plant.** Wang Shoushe (Southwest Inst. of Physics, Leshan, SC (China)). China Nuclear Information Centre, Beijing, BJ (China). Sep 1990. 6p. (In Chinese). (SIP–0041.). Order Number DE93602098. Source: OSTI; NTIS (US Sales Only); INIS.

Using the helium mass-spectrometer leak detector to detect the leak of seams between the tube and face-flange and to measure the total leakage rate are introduced. Measures for improving the detective sensitivity are also discussed. The minimum detectable leakage rate for single tube welding seam was 10^{-8} PaL/s and the minimum detectable leakage rate for the system was 10^{-7} PaL/s. These results not only provide the reliable quality assurance for the vaporizer manufacturing of Qinshan Nuclear Power Plant but also give the large pressure vessel manufacturers a good leak test method.

30886 (CNIC–00479) **Experimental study on critical heat flux with long rod bundle.** Zhang Boyi (China Nuclear Power Inst., SC (China)). China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 11p. (In Chinese). (SINRE–0024.). Order Number DE93602100. Source: OSTI; NTIS (US Sales Only); INIS.

Some new structural features of a long rod bundle test section with experimental method of a type appropriate to the circumstances, data processing and research results are described. The experiments have been performed at a high pressure heat transfer loop. The arrangement of the rod bundle is 3 x 3, square. The rod diameter is 9.5mm, pitch 12.6mm. The effective heating length of each rod is 2200mm. Water or steam-water mixture flows through the rod bundle upwards. The axial heat flux profiles are uniformly distributed. Parameter ranges for the experiments are pressures from 14.4 to 15.7MPa, mass velocities from 1200 to 3540kg/(m^2·s) and burnout qualities from -17% to +15%. The data processing for a total of 95 CHF data points is carried out on VAX computer. The formula for predicting CHF values presened can be used in a field of thermal hydraulic design and safety analysis for PWR.

30887 (CNIC–00503) **A probabilistic safety assessment of in-pile test loop in HWRR.** Cao Xuewu (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Li Zhaohuan. China Nuclear Information Centre, Beijing, BJ (China). Jul 1991. 11p. (IAE–0091.). Order Number DE93602101. Source: OSTI; NTIS (US Sales Only); INIS.

The PSA methodology has been applied to the in-pile test loop which is installed in the Heavy Water Research Reactor (HWRR). This loop is designed and operated for fuel assembly testing of the Qinshan PWR plant. This analysis is to assess the safety and to evaluate the design of this operating loop. The procedure and models are similar to a PSA on nuclear power plant. The major contents in the analysis consist of the familiarization of the object, the investigation and selection of accident initiators, setting events and fault trees, data collections, quantitative calculations, qualitative and result analyses and final conclusion. This analysis is only limited to the initiators of in-pile loop itself and possible errors made by operators during normal operation. The accident occurence is less than $10^{-4}a^{-1}$ which may be recommended as an acceptance risk for safety operation of an in-pile test loop. Finally, suggestions have been raised to improve the design of test loop, especially in reducing operation errors by local operators.

30888 (CNIC–00512) **The dynamic response of the containment of the Qinshan nuclear power plant to the aircraft impact loading.** Zuo Jiahong (Shanghai Nuclear Engineering Research and Development Inst., SH (China)); Han Liangbi; Xia Zufeng. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 14p. (In Chinese). (NERDI–0017.). Order Number DE93602102. Source: OSTI; NTIS (US Sales Only); INIS.

The structural response of the containment of the Qinshan Nuclear Power Plant under the standard-load-function to aircraft impact has been analyzed by using the ADINA code considering an axisymmetric continuum model, which is assumed a mixed-model for the steel-concrete mixture. It consists of 179 four-node isoparametric concrete elements and 118 steel elements. In order to obtain optimum results, the nonlinear behavior of materials and structures, dynamic modes of failure and damage have been considered in the numerical solution. The coordinate system is based on the total Lagrangian formulation. The F.E. system has been solved using an incremental interactions (BFGS method) with 600 steps totally. A discussion of the overall behavior of the containment for the aircraft impact loading, especially the nonlinear behavior of the local impacted area is presented.

30889 (CNIC–00541) **Irradiation test of borosilicate glass burnable poison.** Feng Mingquan (China Nuclear Power Inst., Chengdu, SC (China)); Liao Zumin; Yang Mingjin; Lu Changlong; Huang Deyang; Zeng Wangchun; Zhao Xihou. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 6p. (In Chinese). (SINRE–0032.). Order Number DE93602103. Source: OSTI; NTIS (US Sales Only); INIS.

The irradiation test and post-irradiation examinations for borosilicate glass burnable poison are introduced. Examinations include visual examination, measurement of dimensions and density, and determination of He gas releasing and ^{10}B burnup. The corrosion and phenomenon of irradiation densification are also discussed. Two type glass samples have been irradiated with different levels of neutron flux. It proved that the GG-17 borosilicate glass can be used as burnable poison to replace the ^{10}B stainless steel in the Qinshan Nuclear Power Plant, and it is safe, economical and reasonable.

30890 (CNIC–00545) **Analysis of cracks and fractography on steam generator tubes.** Zhao Wenjin (China Nuclear Power Inst., SC (China)); Pan Ying; Lu Huaichang; Zheng Sikui. China Nuclear Information Centre, Beijing, BJ (China). Sep 1991. 9p. (In Chinese). (SINRE–0034.). Order Number DE93602104. Source: OSTI; NTIS (US Sales Only); INIS.

Metallography, SEM, EDAX, TEM and SAD have been used to characterize the cracks, fractography, including micro-cracks ($<$ 0.1 mm) and its fractography, as well as the microstructure of corrosion film on the fracture surface in 18/8 stainless steel and Fe-Ni base alloy tubes. The failure of these two kinds of tubes were a result of stress corrosion cracking by chlorine ion. The characteristic of micro-crack and its fractography for another Fe-Ni base alloy tube was similar to those of corrosion fatigue. The film of corrosion products on the fracture surface of 18/8 and Fe-Ni base alloy No.2 tubes was apinel $FeCr_2O_4$ and (Fe, Ni)Fe_2O_4 respectively, as face centre cubic structure. In addition, the feature of cracks and fracture and the propagation mechanism for micro-crack are discussed.

30891 (IAEA-TECDOC--659) **Reactor pressure vessel embrittlement: Report of the IAEA extrabudgetary programme on the safety of WWER-440 model 230 nuclear power plants.** International Atomic Energy Agency, Vienna (Austria). Jul 1992. 57p. Order Number DE93602106. Source: OSTI; NTIS (US Sales Only); INIS.

Within the framework of the IAEA extrabudgetary programme on the Safety of WWER-440/230 NPPs, a list of safety issues requiring broad studies of generic interest have been agreed upon by an Advisory Group who met in Vienna in September 1990. The list was later revised in the light of the programme findings. The information on the status of the issues, and on the amount of work already completed and under way in the various countries, needs to be compiled. Moreover, an evaluation of what further work is required to resolve each one of the issues is also necessary. In view of this, the IAEA has started the preparation of a series of status reports on the various issues. This report on the generic safety issue "Reactor Pressure Vessel Embrittlement" presents a comprehensive survey of technical information available in the field and identifies those aspects which require further investigation. 39 refs, 21 figs, 4 tabs.

30892 (INIS-mf--13352) **Report on the activities of the Czechoslovak Atomic Energy Commission in performing its function of State Surveillance over Nuclear Safety of Nuclear Facilities in 1991.** Ceskoslovenska Komise pro Atomovou Energii, Prague (Czechoslovakia). 1992 93p. (In Czech). Order Number DE93602108. Source: OSTI; NTIS (US Sales Only); INIS.

A detailed overview is presented of the results of the State Surveillance over Nuclear Safety at power reactor units which are in operation or under construction, as well as at other facilities such as the A-1 nuclear power plant, spent fuel interim storage facilities, research reactors, facilities for heat removal from nuclear power plants, etc. The operation of all the 8 units of the Jaslovske Bohunice and Dukovany nuclear power plants was stable and reliable in 1991. From among the 327 failures at nuclear power plants in 1991, 6 were classed in category 1 of the INES scale of IAEA, i.e. as anomalies, and one was classed in category 3, i.e. as a serious incident. This was a radiation incident inside the A-1 nuclear power plant which is being decommissioned. Research nuclear facilities performed well without marked failures in 1991. In September 1991, the State Surveillance issued its approval for the permanent operation of the VR-1P teaching reactor at the Faculty of Nuclear Science and Physical Engineering, Czech Technical University in Prague. In the field of radioactive wastes, the State Surveillance concentrated on the evaluation of documents pertaining to the handling of radioactive wastes at Jaslovske Bohunice and Dukovany, and to the regional storage facilities at Mochovce and Dukovany. (Z.S.). 10 tabs., 8 figs.

30893 (JAERI-M--92-012, pp. 311-324) **Iodine chemistry in Falcon.** Beard, A.M. (AEA Technology, Winfrith (United Kingdom)); Bennett, P.J.; Bowsher, B.R.; Nichols, A.L.; Sabathier, F. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The Falcon facility at Winfrith has been designed to study the transport of vapours and aerosols released from simulant and trace-irradiated UO_2 fuel heated upto 2000 K. Fission product deposition can be studied in the presence and absence of control rod and boric acid aerosols along a pathway representing the upper plenum, primary circuit pipework and containment vessel of a light water reactor (including painted surfaces and an aqueous sump of defined initial pH). Various on-line and post-test analytical techniques can be used to provide information on the chemical species and physical forms of the gas-borne debris. A series of Falcon tests have provided evidence for chemical reactions within the primary circuit between iodine-based vapours and aerosols generated from bulk materials, and the formation of volatile, reactive iodine species within the containment. Ten times more iodine was detected on painted surfaces than equivalent unpainted walls, and approximately twenty times more iodine was found in the alkaline sump per unit surface area than on the 304 stainless steel floor. (author).

30894 (JAERI-M--92-012, pp. 346-363) **A comparison of the predictions of the INSPECT reaction set with experimental data.** Barton, R.A. (UKAEA Harwell Lab. (United Kingdom)); Sims, H.E. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The computer program, INSPECT (IodiNe SPECiation and Transport) is a mechanistic code for modelling the thermal and radiolytic chemistry of iodine in reactor faults. Because of the complexity of the program and especially the reaction scheme within it, it is necessary to validate or benchmark the code before it can be used with confidence for predictive purposes. Validation of the reaction set has been attempted by comparison of data from laboratory experiments involving thermal and radiolytic reactions of iodine with the predictions of the program using the experimental conditions as input to the program. This paper describes the results of this comparison exercise using a range of data from the UK and overseas. In general, prediction and data show good agreement and the INSPECT reaction scheme models the thermal and radiation chemistry of I_2, I^- and IO_3^- and the effects of temperature and pH well, but the exercise did show up some problems. (1) Many papers do not give sufficient information such as pH, and the elapsed time between irradiation and measurement which is critical in iodine chemistry. (2) The experimental yield of iodine from irradiated solution is particularly sensitive to pH and this is also the case with model predictions. This sensitivity is a result of the reaction of H_2O_2 with 'iodine' in near neutral and alkaline solution which is very important but the mechanisms and rate constants for the reactions are not accurately known. (3) Uncertainties identified above lead to poor agreement when modelling irradiated neutral solution when post-irradiation reaction is taken into account. It is concluded that it is possible to use a complex reaction scheme to model the chemistry of iodine with confidence, but there are some data required particularly concerning the reactions of H_2O_2 with I_2. (author).

30895 (JAERI-M--92-012, pp. 473-488) **The modelling of iodine behavior for assessing the radiological consequences of a design basis accident.** Dutton, L.M.C. (National Nuclear Corp. Ltd., Knutsford (United Kingdom)); Handy, B.J.; Rousseau, L.; Essler, W. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Recently, the Commission of the European Communities (CEC) has initiated two studies with a view to developing a realistic model for predicting the radiological consequences of a design basis Large Loss of Coolant Accident (LOCA) at a Pressurised Water Reactor (PWR). This paper describes the models that are considered to be the most appropriate for predicting iodine behaviour and discusses their importance in terms of the overall release to the environment. (author).

30896 (JAERI-M--92-015) **Pre-pulse irradiation examination, NSRR pulse irradiation and post-pulse irradiation examination of MH-2 fuel rod.** Yanagisawa, Kazuaki (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Katanishi, Shoji; Homma, Kozo. Japan Atomic Energy Research Inst., Tokyo (Japan). Feb 1992. 217p. (In Japanese, English). Order Number DE93703538. Source: OSTI; NTIS; INIS.

The Nuclear Safety Research Reactor (NSRR) program for studying failure threshold of pre-irradiated LWR fuel under simulated reactivity initiated accident conditions is in progress. In this program, a 14 x 14 PWR type fuel K4-2 was segmented from a

K4/G08 long size PWR rod pre-irradiated in MIHAMA Unit-2 and was pulse irradiated on March 8, 1990 at NSRR. Energy deposition given to the test rod was 68 cal/g·fuel. No failure indication was observed by in-core monitoring and by post-pulse irradiation examination. As one of the NSRR data base on fuel behavior during transient/RIA, data obtained from pre-pulse irradiation examination, during NSRR pulse irradiation, and from post-pulse irradiation examination are summarized. (author).

30897 (NUREG/CR–6010) **History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants.** Martin, G. Jr. (Martin Consulting Services, Inc., Lawrenceville, NJ (United States)). Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Issue Resolution; Martin Consulting Services, Inc., Lawrenceville, NJ (United States); Cohen (S.) and Associates, Inc., McLean, VA (United States). Jul 1992. 85p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; INIS; GPO.

From mid-1982 until 1987, loose thermal sleeves or sleeves with cracked attachment welds were found in several operating Westinghouse nuclear power plants. Westinghouse investigations concluded that these occurrences had been confined to those thermal sleeves of "Generation 311 design. The sleeve problem was a generic issue (Generic Issue No. 73) but affected only those plants using Generation 3 sleeves. The NRC's Safety Evaluation Report, "Evaluation of Thermal Sleeve Problems in Westinghouse Plants", dated October 28, 1983, contains a proposed resolution for the thermal sleeve issue. Because a resolution had been proposed, the issue was considered to be nearly resolved. This report presents updated and supplemental information on the thermal sleeve problem, which affected Westinghouse nuclear power plants using Generation 3 thermal sleeves. The information presented is intended to be the basis for deciding whether this issue can be considered resolved or if any additional information is required to resolve the issue.

30898 (RISO-R–619) **An assessment of ^{238}Pu and $^{239+240}$Pu in the primary cooling water of a PWR.** Chen, Q. (Risoe National Lab. (Denmark)); Nielsen, S.P.; Duniec, S. Risoe National Lab., Roskilde (Denmark). Feb 1992. 20p. Order Number DE92644354. Source: OSTI; NTIS; INIS.

Radiochemical procedures were developed for the analysis of plutonium in primary cooling water and in ion-exchange resin. Analyses of cooling-water samples from unit 2 of the Ringhals nuclear power station demonstrated that a major fraction of the plutonium found in the cooling water is associated with particles. The amounts of plutonium isotopes retained annually in the ion-exchange cleaning system are estimated at 3 MBq of ^{238}Pu and 2 MBq of $^{239+240}$Pu and in a mechanical filter the amounts are estimated at 2 MBq of ^{238}Pu and 0.6 MBq of $^{239+240}$Pu. (au).

30899 (SAND–92-0255) **Experiments to investigate the effects of 1:10 scale Zion structures on direct containment heating (DCH) in the Surtsey Test Facility: The IET-1 and IET-1R tests.** Allen, M.D. (Sandia National Labs., Albuquerque, NM (United States)); Pilch, M.; Griffith, R.O.; Blanchat, T.K.; Nichols, R.T. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 85p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019327. Source: OSTI; NTIS; INIS; GPO Dep.

The Integral Effects Test (IET) series was designed to investigate the effects of subcompartment structures on direct containment heating (DCH). Scale models of the Zion reactor pressure vessel (RPV), cavity, instrument tunnel, and subcompartment structures were constructed in the Surtsey Test Facility at Sandia National Laboratories. The RPV was modelled with a melt generator that consisted of a steel pressure barrier, a cast MgO crucible, and a thin steel inner liner. The melt generator/crucible had a hemispherical bottom head containing a graphite limiter plate with a 4 cm exit hole to simulate the ablated hole in the RPV bottom head that would be formed by tube ejection in a high pressure melt ejection (HPME) accident. The reactor cavity model contained an amount of water (3.48 kg) that was scaled to condensate levels in the Zion plant. Iron oxide, aluminum, chromium thermite (43 kg) was used to simulate molten corium. The driving gas was 440 g·moles of steam at an initial absolute pressure of 7.1 MPa in IET-1 and 477 g·moles of steam at an initial pressure of 6.3 MPa in IET-1R. Steam blowdown entrained debris into the Sorts vessel resulting in a peak pressure increase in Sorts of 98 kPa in IET-1 and 110 kPa in IET-1R. The total debris mass ejected into the Sorts vessel was 43.0 kg in IET-1, compared to 36.2 kg in IET-1R. The Sorts vessel had been previously inerted with N_2. The total quantity of hydrogen produced by steam/metal reactions was 223 g·moles in IET-1 and 252 g·moles in IET-1R.

30900 (SAND–92-0663C) **Nuclear reactor pressure vessel-specific flaw distribution development.** Rosinski, S.T. Sandia National Labs., Albuquerque, NM (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9205235–1: International Atomic Energy Agency (IAEA) specialists meeting on integrity of pressure components of reactor systems, Paks (Hungary), 25-29 May 1992). Order Number DE92017426. Source: OSTI; NTIS; INIS; GPO Dep.

Vessel integrity predictions performed through fracture mechanics analysis of a pressurized thermal shock event have been shown to be significantly sensitive to the overall flaw distribution input. It has also been shown that modern vessel in-service inspection (ISI) results can be used for development of vessel flaw distribution(s) that are more representative of US vessels. This paper describes the development and application of a methodology to analyze ISI data for the purpose of flaw distribution determination. The resultant methodology considers detection reliability, flaw sizing accuracy, and flaw detection threshold in its application. Application of the methodology was then demonstrated using four recently acquired US PWR vessel inspection data sets. Throughout the program, new insight was obtained into several key inspection performance and vessel integrity prediction practice issues that will impact future vessel integrity evaluation. For example, the potential application of a vessel-specific flaw distribution now provides at least one method by which a vessel-specific reference flaw size applicable to pressure-temperature limit curves determination can be estimated. This paper will discuss the development and application of the methodology and the impact to future vessel integrity analyses.

2103 Power Reactors, Nonbreeding, Graphite Moderated

Refer also to citation(s) 30975, 30991, 31002

30901 (ANL/CP–75204) **Non-isotropic thermal behavior of an MHTGR fuel block: Impact upon reactivity feedback.** Delpech, M. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France)); Singer, R.M.; Finck, P.J. Argonne National Lab., IL (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920903–14: International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants, Salt Lake City, UT (United States), 20-24 Sep 1992). Order Number DE92019590. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses lumped parameter and detailed multidimensional thermal analyses of a New Production Modular High Temperature Gas Cooled Reactor (NP-MHTGR) fuel block were conducted that indicated that during a power transient, the target temperature would rise significantly later than the fuel temperature. This behavior, which is due to radiative, convective and conductive heat transport phenomena within the fuel block coupled with the significantly different thermal physical properties of the fuel block materials, leads to the potential for a delayed positive contribution to the temperature coefficient of reactivity of the NP-MHTGR core during TOP events. These results have indicated the need for additional experimental and analytical studies in order to more fully assess the design, operational and safety implications of this phenomenon. In addition, experiments in the TREAT facility are planned to provide additional data to assist in the capabilities to predict the reactivity feedback characteristics of the NP-MHTGR core. These studies will be the subject of a future paper.

30902 (DOE/RW–0184-R1-Vol.4) **Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B,**

Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, Supplemental data for Fast Flux Test Facility. Oak Ridge National Lab., TN (United States). Jul 1992. 158p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–2217-Vol.4). Source: INIS; OSTI (Free of Charge).

Volume 4 contains the following appendices: nuclear reactors at educational institutions in the United States; data sheets for nuclear reactors at educational institutions in the United States(operational reactors and shut-down reactors); supplemental data for Fort St. Vrain spent fuel; supplemental data for Peach Bottom 1 spent fuel; and supplemental data for Fast Flux Test Facility.

30903 (GA-A–20998) **Impact of increasing MHTGR power on passive heat removal.** Dunn, T.D.; Schwartz, A.A.; Silady, F.A. General Atomics, San Diego, CA (United States). Jul 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-89SF17885. (CONF-9207123–1: International Atomic Energy Agency (IAEA) specialists' meeting, Juelich (Germany), 6-10 Jul 1992). Order Number DE92018622. Source: OSTI; NTIS; INIS; GPO Dep.

In 1990 a cost reduction study recommended that the reference US MHTGR module design be changed to an 84-column, 450 MW(t) annular reactor core to attain improved economics with the same high level of safety as the previous reference 66-column, 350 MW(t) MHTGR module. The objective of this paper is to report on a recently completed core configuration trade study that reviewed the basis for that recommendation with more detailed assessments. The trade study examined alternate core configurations in terms of the size, shape, and power level. Core configurations at 450 MW(t), an alterative at higher power, and one at lower power were considered. These alternatives represented the maximum achievable power for fuel element for two different reactor vessel sizes. Fuel, reactor internal and vessel temperatures during pressurized and depressurized conduction cooldown transients are presented and compared to limits. Based on the need to improve economics without sacrificing the MHTGR's high level of safety, the trade study confirmed that the previously selected 84-column, 450 MW(t) annular design remains the preferable configuration.

30904 (NUREG/CR–5810) **Evaluation of MHTGR fuel reliability.** Wichner, R.P. (Oak Ridge National Lab., TN (United States)); Barthold, W.P. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Oak Ridge National Lab., TN (United States). Jul 1992. 58p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/TM–12014). Source: OSTI; NTIS; INIS; GPO.

Modular High-Temperature Gas-Cooled Reactor (MHTGR) concepts that house the reactor vessel in a tight but unsealed reactor building place heightened importance on the reliability of the fuel particle coatings as fission product barriers. Though accident consequence analyses continue to show favorable results, the increased dependence on one type of barrier, in addition to a number of other factors, has caused the Nuclear Regulatory Commission (NRC) to consider conservative assumptions regarding fuel behavior. For this purpose, the concept termed "weak fuel" has been proposed on an interim basis. "Weak fuel" is a penalty imposed on consequence analyses whereby the fuel is assumed to respond less favorably to environmental conditions than predicted by behavioral models. The rationale for adopting this penalty, as well as conditions that would permit its reduction or elimination, are examined in this report. The evaluation includes an examination of possible fuel-manufacturing defects, quality-control procedures for defect detection, and the mechanisms by which fuel defects may lead to failure.

2104 Power Reactors, Nonbreeding, Otherwise Moderated Or Unmoderated

Refer also to citation(s) 31014, 31032

30905 (INIS-mf–13337) **The safety of Ontario's nuclear power reactor. A scientific and technical review. Report to the Minister.** The safety of Ontario's nuclear power reactors. A scientific and technical review. Hare, F.K. Ontario Nuclear Safety Review, Toronto, ON (Canada). 29 Feb 1988 93p. (In English, French). Order Number DE93602118. Source: OSTI; NTIS (US Sales Only); INIS.

In December 1986 a study of the safety of the design, operating procedures and emergency plans associated with Ontario Hydro's nuclear generating plants was commissioned by the government of the province of Ontario. After receiving briefs from many interested groups and individuals, visiting the power plants, and consulting with nuclear industry and regulatory representatives in Canada and other countries, the commissioner presented this report to the Minister of Energy for Ontario. His major conclusion is that Ontario Hydro reactors are being operated safely and at high standards of technical performance. No significant adverse impact has been detected in either the work force or the public. The risk of accidents serious enough to affect the public adversely can never be zero, but is very remote. Major recommendations are that: Ontario Hydro re-examine its operational organization closely and commission a study of factors affecting human performance; and, that priority be given to finding a solution to pressure tube performance problems and to improving in-reactor monitoring. Sixteen other recommendations are presented relating to research and development, information exchange with other organizations, reactor performance, training, severe accident analysis, the provincial nuclear emergency plan, epidemiological studies, the Atomic Energy Control Board, public hearings, and women in the nuclear industry.

30906 (INIS-mf–13338) **The safety of Ontario's nuclear power reactors. A scientific and tecnical review. Vol. 1: Report to the Minister, technical report and annexes.** The safety of Ontario's nuclear power reactors. A scientific and technical review. Hare, F.K. Ontario Nuclear Safety Review, Toronto, ON (Canada). 29 Feb 1988 408p. Order Number DE93602119. Source: OSTI; NTIS (US Sales Only); INIS.

In December 1986 a study of the safety of the design, operating procedures and emergency plans associated with Ontario Hydro's nuclear generating plants was commissioned by the government of the province of Ontario. After receiving briefs from many interested groups and individuals, visiting the power plants, and consulting with nuclear industry and regulatory representatives in Canada and other countries, the commissioner presented this report to the Minister of Energy for Ontario. His major conclusion is that Ontario Hydro reactors are being operated safely and at high standards of technical performance. No significant adverse impact has been detected in either the work force or the public. The risk of accidents serious enough to affect the public adversely can never be zero, but is very remote. Major recommendations are that: Ontario Hydro re-examine its operational organization closely and commission a study of factors affecting human performance; and, that priority be given to finding a solution to pressure tube performance problems and to improving in-reactor monitoring. Sixteen other recommendations are presented relating to research and development, information exchange with other organizations, reactor performance, training, severe accident analysis, the provincial nuclear emergency plan, epidemiological studies, the Atomic Energy Control Board, public hearings, and women in the nuclear industry. This volume contains a detailed technical analysis of the CANDU system, its associated safety procedures, emergency measures required in the case of a nuclear accident, and regulation of the Canadian nuclear industry. Annexes provide further details on the operation of the Ontario Nuclear Safety Review.

30907 (INIS-mf–13340 vp.) **The role of nuclear power plant designers.** Atomic Energy of Canada Ltd., Ottawa, ON (Canada); Atomic Energy of Canada Ltd., Sheridan Park, ON (Canada). CANDU Operations. Aug 1987. 117p. In *The safety of Ontario's nuclear power reactors. A scientific and technical review. A submission to the Ontario Nuclear Safety Review by Atomic Energy Canada Limited.* Order Number DE92642418. Source: OSTI; NTIS (US Sales Only); INIS.

When design of a nuclear power plant begins its designers, owners, and regulators make a safety judgement based on their knowledge and collective experience. As time goes on safety criteria change, methods improve, new scientific understanding is gained, and the cost of safety increases in relation to the benefits gained. In spite of that, the fundamental safety of CANDU remains and will continue high. However, the designer's job has become more difficult. The process of designing a product to satisfy a customer using a perceived view of that benefits society is no longer simple. Is the customer the utility or an amalgam of government departments and various factions of the public? How is the designer to make judgements on social acceptability when society speaks with so many voices and so little leadership.

30908 (INIS-mf--13341) **The safety of Ontario's nuclear power reactors. A scientific and technical review. Vol. 2: Appendices.** The Safety of Ontario's Nuclear Power Reactors. A scientific and technical review. Hare, F.K. Ontario Nuclear Safety Review, Toronto, ON (Canada). 29 Feb 1988 580p. Order Number DE93602120. Source: OSTI; NTIS (US Sales Only); INIS.

These appendices contain seven detailed elaborations of matters covered more superficially in the Technical Report. They have been written by well-known authorities, or by the professional staff of the Review. They are essential supplements to the condensed material of the Technical Report. Several of the appendices contain detailed recommendations. Some of these have been incorporated into the Review's overall conclusions and recommendations. Others stand alone, as the opinions of the appendices' authors. I am in broad agreement with most of them, but have preferred to leave them within the authors' material. I hope that they will be given detailed study by appropriate bodies, especially Ontario Hydro and the Atomic Energy Control Board.

30909 (INIS-mf--13342) **The safety of Ontario's nuclear power reactors. A scientific and technical review. Selected consultants' reports.** The Safety of Ontario's Nuclear Power Reactors. A Scientific and Technical Review. Hare, F.K. Ontario Nuclear Safety Review, Toronto, ON (Canada). 29 Feb 1988 574p. Order Number DE93602127. Source: OSTI; NTIS (US Sales Only); INIS.

The Review commissioned 31 consultants to prepare detailed analyses of specific safety-related questions raised by the design and operation of Ontario Hydro's CANDU reactors. This volume presents 10 of these reports, which I judge to be of sufficient general importance to justify the cost of wide circulation. They have been reproduced precisely as they were submitted. They do not express the Review's own judgements, but do contain a major part of the evidence that influenced those judgements. In several cases the consultants have presented formal recommendations. Some of these have been incorporated, often in modified form, as Review recommendations, in the Minister's Report. Others remain simply as recommendations from the individual consultants. I agree with most of them, but have not seen them as central to the Review's conclusions. I suggest that appropriate institutions--most notably Ontario Hydro and Atomic Energy Control Board--study them, and act as they see fit.

2105 Power Reactors, Breeding

Refer also to citation(s) 30642, 30685, 31004

30910 (ANL/CP--74685) **Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code.** Dunn, F. Argonne National Lab., IL (United States). [1992]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920903--12: International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants, Salt Lake City, UT (United States), 20-24 Sep 1992). Order Number DE92019588. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses a hot channel treatment which has been added to the SASSYS-1 LMR systems analysis code by providing for a multiple pin treatment of each of one or more subassemblies. This is an explicit calculation of intra-subassembly effects, not a hot-channel adjustment to a calculated average channel. Thus, the code can account for effects such as transient flow redistribution, both within a subassembly and among subassemblies. The code now provides a total integrated thermal hydraulic treatment including a multiple pin treatment within subassemblies, a multi-channel treatment of the whole core, and models for the primary coolant loops, the intermediate coolant loops, the steam generators, and the balance of plant. Currently the multiple-pin option is only implemented for single-phase calculations. It is not applicable after the onset of boiling or pin disruption. The new multiple pin treatment is being verified with detailed temperature data from instrumented subassemblies in EBR-II, both steady-state and transient, with special emphasis on passive safety tests such as SHRT-45. For the SHRT-45 test, excellent agreement is obtained between code predictions and experimental measurements of coolant temperatures.

30911 (BNL-NUREG--47747) **An improved numerical model for the investigation of thermal hydraulic phenomena with applications to LMR reactor components.** Chan, B.C.; Kennett, R.J.; Van Tuyle, G.J. Brookhaven National Lab., Upton, NY (United States). [1992]. 46p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-921110--11: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92018144. Source: OSTI; NTIS; INIS; GPO Dep.

A basic limited scope, fast-running computer model is presented for the solution of single phase two-dimensional transients in thermally coupled incompressible fluid flow problems. The governing equations and the two-equation transport model (k-ϵ) of turbulence are reduced to a set of linear algebraic equations in an implicit finite difference scheme, based on the control volume approach. These equations are solved iteratively in a line-by-line procedure using the tri-diagonal matrix algorithm. The numerical formulation and general calculational procedure are described in detail. The calculations show good agreement when compared with experimental data and other independent analyses.

30912 (EUR--13903) **Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3.** Kleinert, K.P. (Internationale Atomreaktorbau GmbH (INTERATOM), Bergisch Gladbach (Germany)). Commission of the European Communities, Luxembourg (Luxembourg). 1992. 111p. Contract RAP-062-D. Source: OSTI; NTIS (US Sales Only); INIS.

The study analyses and compares German, French, British and Italian practices and procedures applied for various LMFBR projects both related to the quality assurance system and related to the particular type of class of component:Class 1: primary reactor vessel; Class 2: Secondary sodium pump; Class 3: Primary cold trap. Various areas of analysis and comparison were selected to identify the underlying concepts of grading of requirements and measures, to identify the similarities and differences, and to give recommendations for further actions concerning quality assurance requirements 60 refs., 21 tabs., 6 figs.

30913 (EUR--13917) **Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization.** Koehler, S. (Internationale Atomreaktorbau GmbH (INTERATOM), Bergisch Gladbach (Germany)). Commission of the European Communities, Luxembourg (Luxembourg). 1992. 87p. Contract RAP-061-D. Source: OSTI; NTIS (US Sales Only); INIS.

A comparative study has been conducted, within the framework of the exercises of comparisons of specifications and standards for fast reactors in the following specialized fields: - welding supervisor, welder; - welder's tests; -production test specimens of welds; - measures to prevent mistakes with weld material. The relevant specifications were forwarded by the national delegations: Germany, France, Italy and United Kingdom. The comparison has been presented in tabular form where rules for a particular subgroup of specialized field are laid down in the standards of at least two Member States. In each case, the conclusions and requirements set out in the national standards have been compared in relation to a specific comparison criterion. The quantitative comparisons of the requirements laid down in the individual national standards are assessed from the following standpoints: (a) points of agreement between the regulations in the standards of all four Member States (Germany, France, United Kingdom and Italy); (b) significant differences between the regulations. 13 tabs.

2106 Power Reactors, Mobile, Propulsion, Package, and Transportable

30914 (EGG-M–92359) **A development approach for nuclear thermal propulsion.** Buden, D. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9208114–1: American Nuclear Society meeting, Jackson Hole, WY (United States), 16-19 Aug 1992). Order Number DE92018020. Source: OSTI; NTIS; INIS; GPO Dep.

The cost and time to develop nuclear thermal propulsion systems are very approach dependent. The objectives addressed are the development of an "acceptable" nuclear thermal propulsion system that can be used as part of the transportation system for people to explore Mars and the enhancement performance of other missions, within highly constrained budgets and schedules. To accomplish this, it was necessary to identify the cost drivers considering mission parameters, safety of the crew, mission success, facility availability and time and cost to construct new facilities, qualification criteria, status of technologies, management structure, and use of such system engineering techniques as concurrent engineering.

30915 (LA-UR–92-2252) **Liquid hydrogen flow problems in Kiwi reactors.** Thurston, R.S. Los Alamos National Lab., NM (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209177–1: Nuclear power engineering in space nuclear rocket engines, Kazakhstan (Russian Federation), 22-26 Sep 1992). Order Number DE92018383. Source: OSTI; NTIS; GPO Dep.

The Kiwi series of reactors were the first ones tested in the US Rover Program in the development of nuclear rocket engines for space propulsion. The early experiments with liquid hydrogen showed that parallel flow systems were prone to uneven flow distributions and violent fluctuations in pressure and flow that were capable of destroying a reactor core. Kiwi flow distribution problems were solved by using multiple feed lines into the nozzle cooling system and carefully balancing impedance among them. The violent pressure and flow fluctuations were eliminated after their cause was identified as resonance phenomena driven by the response to flow disturbances of heat transfer through a superheated hydrogen layer. Smooth flow operations were assured by rapidly bringing operating pressures beyond several times the critical pressure of hydrogen. After this initial rough start, solid core nuclear rocket engines successfully passed milestones of achievements during the remainder of the Rover program.

30916 (SAND–92-1200C) **A computer program for engineering simulations of space reactor system performance.** Dobranich, D. Sandia National Labs., Albuquerque, NM (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921102–8: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92016400. Source: OSTI; NTIS; GPO Dep.

Nuclear thermal propulsion systems are envisioned as a fast and efficient form of transportation for the exploration of space. Several nuclear reactor concepts have been proposed. This document discusses SAFSIM (System Analysis Flow SIMulator) which is an engineering computer program that allows the fluid mechanic, heat transfer, and reactor dynamic simulation of the entire propulsion system. SAFSIM currently contains three basic physics modules: (1) fluid mechanics, (2) heat transfer, and (3) reactor dynamics. All three modules are coupled to allow the prediction of system performance. The analyst can employ any or all of the physics modules as the problem dictates.

30917 (SAND–92-1566C) **Ground test facility for SEI nuclear rocket engines.** Harmon, C.D.; Ottinger, C.A.; Sanchez, L.C.; Shipers, L.R. Sandia National Labs., Albuquerque, NM (United States). [1992]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920747–8: 28. joint propulsion conference, Nashville, TN (United States), 6-8 Jul 1992). Order Number DE92017418. Source: OSTI; NTIS; GPO Dep.

Nuclear Thermal Propulsion (NTP) has been identified as a critical technology in support of the NASA Space Exploration Initiative (SEI). In order to safely develop a reliable, reusable, long-lived flight engine, facilities are required that will support ground tests to qualify the nuclear rocket engine design. Initial nuclear fuel element testing will need to be performed in a facility that supports a realistic thermal and neutronic environment in which the fuel elements will operate at a fraction of the power of a flight weight reactor/engine. Ground testing of nuclear rocket engines is not new. New restrictions mandated by the National Environmental Protection Act of 1970, however, now require major changes to be made in the manner in which reactor engines are now tested. These new restrictions now preclude the types of nuclear rocket engine tests that were performed in the past from being done today. A major attribute of a safely operating ground test facility is its ability to prevent fission products from being released in appreciable amounts to the environment. Details of the intricacies and complications involved with the design of a fuel element ground test facility are presented in this report with a strong emphasis on safety and economy.

2107 Regulation and Licensing

Refer also to citation(s) 30766, 30897, 30912, 30913, 30942, 31016, 31017

30918 (CNIC–00488) **Nuclear safety legislation and supervision in China.** Zhang Shiguan (China Nuclear Information Centre, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 9p. Order Number DE93602436. Source: OSTI; NTIS (US Sales Only); INIS.

The cause for the urgent need of nuclear safety legislation and supervision in China is firstly described, and then a brief introduction to the basic principle and guideline of nuclear safety is presented. Finally the elaboration on the establishment of nuclear safety regulatory system, the enactment of a series of regulations and safety guides, and the implementation of licencing, nuclear safety supervision and research for ensuring the safety of nuclear energy, since the founding of the National Nuclear Safety Administration, are introduced.

30919 (JAERI-M–92-012, pp. 35-48) **Iodine chemical form in LWR reactor accidents: Regulatory perspectives in the United States.** Soffer, L. (Nuclear Regulatory Commission, Washington, DC (United States)). Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Recent technical evaluations of the likely chemical form of the iodine released from the reactor coolant system into the containment, done under the auspices of the Nuclear Regulatory Commission, are reviewed for their implications for the present assumptions in US licensing actions. The present assumptions are contained in Regulatory Guides 1.3 and 1.4, both of which are based on Technical Information Document (TID)-14844. The NRC intends to update those assumptions for use in licensing actions for advanced LWR reactors. With NRC approval, existing and evolutionary plants may be allowed to use updated insights from this research in licensing actions. The plans for modifications of existing guidance and the schedules for such changes will be discussed. (author).

30920 (NUREG–0750-Vol.35-No.6) **Nuclear Regulatory Commission issuances, June 1992: Volume 35, No. 6.** Nuclear Regulatory Commission, Washington, DC (United States). Div. of Freedom of Information and Publications Services. Jun 1992. 60p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; INIS; GPO.

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judges (ALJ), the Directors' Decisions (DD), and the Denials of Petitions for Rulemaking (DPRM).

30921 (NUREG/CR–4469-Vol.13) **Nondestructive examination (NDE) Reliability for inservice inspection of Light Water**

Reactors: Semiannual report, October 1990–March 1991: Volume 13. Doctor, S.R. (Pacific Northwest Lab., Richland, WA (United States)); Good, M.S.; Heasler, P.G.; Hockey, R.L.; Simonen, F.A.; Spanner, J.C.; Taylor, T.T.; Vo, T.V. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 72p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC06-76RL01830. (PNL–5711-Vol.13). Source: OSTI; NTIS; INIS; GPO.

The Evaluation and Improvement of NDE reliability for Inservice Inspection of Light Water Reactors (NDE Reliability) Program at the Pacific Northwest Laboratory was established by the Nuclear Regulatory Commission to determine the reliability of current inservice inspection (ISI) techniques and to develop recommendations that will ensure a suitably high inspection reliability. The objectives of this program include determining the reliability of ISI performed on the primary systems of commercial light-water reactors (LWRs); using probabilistic fracture mechanics analysis to determine the impact of NDE unreliability on system safety; and evaluating reliability improvements that can be achieved with improved and advanced technology. A final objective is to formulate recommended revisions to the Regulatory and ASME Code requirements, based on material properties, service conditions, and NDE uncertainties.

2108 Economics

30922 (CNIC–00516) **The model and optimization of HTGR nuclear fuel cycle: Pt. 2: Multi-reactor model.** Dai Weizhi (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Zhao Jianjun. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 14p. (In Chinese). (TSHUNE–0020.). Order Number DE93602375. Source: OSTI; NTIS (US Sales Only); INIS.

Nuclear fuel cycle of two kinds of HTGR fuels (uranium enrichment 8.53% and 93%) has been studied under the conditions that forty 1000 MWe HTGRs are put into operation in a 30 years period. The cycle with fuel reprocessing is compared with once through cycle and the nuclear fuel cycle of HTGR is compared with that of PWR. The calculation results is as following: The once through cycle is cheeper than cycle with reprocessing about 3 ≈ 7% in economy, but the natural uranium consumption is about 16% greater and the natural thorium consumption is about 50% greater. Considering economy and resource simultaneously the cycle with reprocessing is much better. Comparing with PWR the nuclear cycle of HTGR is also better in economy and saving of resource.

30923 (CNIC–00517) **The model and optimization of HTGR nuclear fuel cycle: Pt. 1: Mono-reactor model.** Dai Weizhi (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Wan Chunrong; Hu Xien; Yang Xin. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 12p. (In Chinese). (TSHUNE–0021.). Order Number DE93602376. Source: OSTI; NTIS (US Sales Only); INIS.

Nuclear Fuel Cycle of three HTGR fuels has been studied. The cycle with fuel reprocessing is compared with once through cycle. The results show that the cycle with fuel reprocessing is better than once through cycle in cost as reprocessing price is about 800 ≈ 1000 [US$/kgHM]. In saving resource, cycle with fuel reprocessing is less than once through cycle for about 30% in natural uranium and about 92% in natural thorium.

30924 (CNIC–00549) **Economic benefits of increased discharge burnup for PWR: Prospect of increasing discharge burnup for Daya Bay NPP and Qinshan NPP1.** Liu Dingqin (Beijing Inst. of Nuclear Engineering, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China). Sep 1991. 14p. (BINE–0015.). Order Number DE93602366. Source: OSTI; NTIS (US Sales Only); INIS.

Increased discharge burnup brings a great deal of benefits to the utilities. The total fuel cost and its fraction in different fuel cycle activities have been calculated at different discharge burnup level and given specific conditions by using DQUECO code developed by author himself for the Qinshan NPP1 and Daya Bay NPP on a 12 month cycle. It is also pointed out that increasing burnup from 33.0 GWd/tU to 40.7 GWd/tU for the Daya Bay NPP and increasing burnup from 24.0 GWd/tU to 32.0 GWd/tU for the Qinshan NPP1 are not only technically possible, but also economically beneficial.

30925 (IFE/KR/E–92/005) **Nuclear power - status and development 1991/1992.** Lingjaerde, R.O. Institutt for Energiteknikk, Kjeller (Norway). Aug 1992. 38p. (In Norwegian). Order Number DE93602362. Source: OSTI; NTIS; INIS.

A generally survey of the present global position of nuclear power is given. A review of Soviet-designed nuclear power plants is also presented. 8 refs., 8 tabs.

22 NUCLEAR REACTOR TECHNOLOGY

30926 (DOE-HDBK–1010-92) **DOE Fundamentals Handbook: Classical Physics.** USDOE, Washington, DC (United States). Jun 1992. 132p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019784. Source: OSTI; NTIS; INIS; GPO Dep.

The Classical Physics Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of physical forces and their properties. The handbook includes information on the units used to measure physical properties; vectors, and how they are used to show the net effect of various forces; Newton's Laws of motion, and how to use these laws in force and motion applications; and the concepts of energy, work, and power, and how to measure and calculate the energy involved in various applications. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility systems and equipment.

30927 (DOE-HDBK–1011/1-92) **DOE Fundamentals Handbook: Electrical Science, Volume 1.** USDOE, Washington, DC (United States). Jun 1992. 157p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019785. Source: OSTI; NTIS; INIS; GPO Dep.

The Electrical Science Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of electrical theory, terminology, and application. The handbook includes information on alternating current (AC) and direct current (DC) theory, circuits, motors, and generators; AC power and reactive components; batteries; AC and DC voltage regulators; transformers; and electrical test instruments and measuring devices. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility electrical equipment.

30928 (DOE-HDBK–1011/2-92) **DOE Fundamentals Handbook: Electrical Science, Volume 2.** USDOE, Washington, DC (United States). Jun 1992. 108p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019786. Source: OSTI; NTIS; INIS; GPO Dep.

The Electrical Science Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding terminology, and application. The handbook includes information on alternating current (AC) and direct current (DC) theory, circuits, motors, and generators; AC power and reactive components; batteries; AC and DC voltage regulators; transformers; and electrical test instruments and measuring devices. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility electrical equipment.

30929 (DOE-HDBK–1011/3-92) **DOE Fundamentals Handbook: Electrical Science, Volume 3.** USDOE, Washington, DC (United States). Jun 1992. 116p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019787. Source: OSTI; NTIS; INIS; GPO Dep.

The Electrical Science Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of electrical theory, terminology, and application. The handbook includes information on alternating current (AC) and direct current (DC) theory, circuits, motors and generators; AC power and reactive components; batteries; AC and DC voltage regulators; transformers; and electrical test instruments and measuring devices. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility electrical equipment.

30930 (DOE-HDBK-1011/4-92) **DOE Fundamentals Handbook: Electrical Science, Volume 4.** USDOE, Washington, DC (United States). Jun 1992. 132p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019788. Source: OSTI; NTIS; INIS; GPO Dep.

The Electrical Science Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of electrical theory, terminology, and application. The handbook includes information on alternating current (AC) and direct current (DC) theory, circuits, motors, and generators; AC power and reactive transformers; and electrical test components; batteries; AC and DC voltage regulators; instruments and measuring devices. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility electrical equipment.

30931 (DOE-HDBK-1012/1-92) **DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 1.** USDOE, Washington, DC (United States). Jun 1992. 131p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019789. Source: OSTI; NTIS; INIS; GPO Dep.

The Thermodynamics, Heat Transfer, and Fluid Flow Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of the thermal sciences. The handbook includes information on thermodynamics and the properties of fluids; the three modes of heat transfer – conduction, convection, and radiation; and fluid flow, and the energy relationships in fluid systems. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility fluid systems.

30932 (DOE-HDBK-1012/2-92) **DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 2.** USDOE, Washington, DC (United States). Jun 1992. 74p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019790. Source: OSTI; NTIS; INIS; GPO Dep.

The Thermodynamics, Heat Transfer, and Fluid Flow Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of the thermal sciences. The handbook includes information on thermodynamics and the properties of fluids; the three modes of heat transfer – conduction, convection, and radiation; and fluid flow, and the energy relationships in fluid systems. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility fluid systems.

30933 (DOE-HDBK-1012/3-92) **DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 3.** USDOE, Washington, DC (United States). Jun 1992. 75p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019791. Source: OSTI; NTIS; INIS; GPO Dep.

The Thermodynamics, Heat Transfer, and Fluid Flow Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of the thermal sciences. The handbook includes information on thermodynamics and the properties of fluids; the three modes of heat transfer – conduction, convection, and radiation; and fluid flow, and the energy relationships in fluid systems. This information will provide personnel with a foundation for understanding the basic operation of various types of DOE nuclear facility fluid systems.

30934 (DOE-HDBK-1013/1-92) **DOE Fundamentals Handbook: Instrumentation and Control, Volume 1.** USDOE, Washington, DC (United States). Jun 1992. 122p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019792. Source: OSTI; NTIS; INIS; GPO Dep.

The Instrumentation and Control Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of instrumentation and control systems. The handbook includes information on temperature, pressure, flow, and level detection systems; position indication systems; process control systems; and radiation detection principles. This information will provide personnel with an understanding of the basic operation of various types of DOE nuclear facility instrumentation and control systems.

30935 (DOE-HDBK-1013/2-92) **DOE Fundamentals Handbook: Instrumentation and Control, Volume 2.** USDOE, Washington, DC (United States). Jun 1992. 161p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019793. Source: OSTI; NTIS; INIS; GPO Dep.

The Instrumentation and Control Fundamentals Handbook personnel, and the technical staff facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of instrumentation and control systems. The handbook includes information on temperature, pressure, flow, and level detection systems; position indication systems; process control systems; and radiation detection principles. This information will provide personnel with an understanding of the basic operation of various types of DOE nuclear facility instrumentation and control systems.

30936 (DOE-HDBK-1014/1-92) **DOE Fundamentals Handbook: Mathematics, Volume 1.** USDOE, Washington, DC (United States). Jun 1992. 196p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019794. Source: OSTI; NTIS; INIS; GPO Dep.

The Mathematics Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of mathematics and its application to facility operation. The handbook includes a review of introductory mathematics and the concepts and functional use of algebra, geometry, trigonometry, and calculus. Word problems, equations, calculations, and practical exercises that require the use of each of the mathematical concepts are also presented. This information will provide personnel with a foundation for understanding and performing basic mathematical calculations that are associated with various DOE nuclear facility operations.

30937 (DOE-HDBK-1014/2-92) **DOE Fundamentals Handbook: Mathematics, Volume 2.** USDOE, Washington, DC (United States). Jun 1992. 104p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019795. Source: OSTI; NTIS; INIS; GPO Dep.

The Mathematics Fundamentals Handbook was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of mathematics and its application to facility operation. The handbook includes a review of introductory mathematics and the concepts and functional use of algebra, geometry, trigonometry, and calculus. Word problems, equations, calculations, and practical exercises that require the use of each of the mathematical concepts are also presented. This information will provide personnel with a foundation for understanding and performing basic mathematical calculations that are associated with various DOE nuclear facility operations.

2201 Theory and Calculation

Refer also to citation(s) 30910, 31388, 32210, 32353, 32529, 32532, 32533, 32534, 32541

30938 (WSRC-MS-92-269) **A discrete ordinates approximation to the neutron transport equation applied to generalized geometries.** DeHart, M.D. Westinghouse Savannah River Co., Aiken, SC (United States). Dec 1992. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92040165. Source: OSTI; NTIS; GPO Dep.

Thesis. Submitted to Texas A&M University, College Station, TX.

A method for applying the discrete ordinates method for solution of the neutron transport equation in arbitary two-dimensional meshes has been developed. The finite difference approach normally used to approximate spatial derivatives in extrapolating angular fluxes across a cell is replaced by direct solution of the characteristic form of the transport equation for each discrete direction. Thus, computational cells are not restricted to the traditional shape of a mesh element within a given coordinate system. However, in terms of the treatment of energy and angular dependencies, this method resembles traditional discrete ordinates techniques. Using the method developed here, a general two-dimensional space can be approximated by an irregular mesh comprised of arbitrary polygons. The present work makes no assumptions about the orientations or the number of sides in a given cell, and computes all geometric relationships between each set of sides in each cell for each discrete direction. A set of non-reentrant polygons can therefore be used to represent any given two dimensional space. Results for a number of test problems have been compared to solutions obtained from traditional methods, with good agreement. Comparisons include benchmarks against analytical results for problems with simple geometry, as well numerical results obtained from traditional discrete ordinates methods by applying the ANISN and TWOTRAN computer programs. Numerical results were obtained for problems ranging from simple one-dimensional geometry to complicated multidimensional configurations. These results have demonstrated the ability of the developed method to closely approximate complex geometrical configurations and to obtain accurate results for problems that are extremely difficult to model using traditional methods.

2202 Components and Accessories

Refer also to citation(s) 30979, 30994, 31005, 31013, 31024, 31030, 31040, 31212, 31227, 31267, 32516, 32551

30939 (CEAC-R-5-92) **Calchulation of physical parameters of the subcritical assembly located in the higher institute of Nuclear Sciences and Technology.** Castaneda Donate, S. (Centro de Estudios Aplicados al Desarrollo Nuclear (CEADEN), La Habana (Cuba)); Quintero, B.; Santos, J. Comision de Energia Atomica, La Habana (Cuba). 1992 20p. (In Spanish). Order Number DE93602041. Source: OSTI; NTIS (US Sales Only); INIS.

A detailed calculation of the core is necessary to analyze the influence of the neutron source on the neutron flux in the subcritical assembly of the Higher Institute Nuclear Science and Technology. A new calculation methodology for the neutronic characteristics of the subcritical assembly is presented, based on the calculation tools available nowadays in our department (WIMS, SNAP, etc). The main results are: Neutron-physical constants of the reactor cells; absolute neutron flux distribution and an estimation of the adequate regions for detector location based on higher armonic terms influence.

30940 (ECN-RX-91-049) **Status of the JEF and EFF projects: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991.** Nordborg, C. (NEA Data Bank, Gif-sur-Yvette (France)); Gruppelaar, H.; Savatores, M. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 8p. (CONF-910503-: International conference on nuclear data for science and technology, Juelich (Germany), 13-17 May 1991). Order Number DE93602042. Source: OSTI; NTIS; INIS.

Following positive experiences gained with the 1st version of JEF (Joint Evaluated File) library, which was distributed to NEA Data Bank member countries in 1985, a significantly improved version, JEF-2.0 (in ENDF-6 format), was distributed for testing end February 1990. It is planned to compile, middle 1991, following intensive benchmark testing, a version of JEF-2 library for general use. EFF (European Fusion File) and associated EAF (European Activation File) projects are sponsored by the European Community's Fusion Technology Programme. The programme of EFF is in its 2nd phase, after the successful completion of the EFF-1 data file. This phase has been defined 1989-1991 and the emphasis is on improvement of a shielding data base. The EFF-2 library will be ready end 1991 and contain new evaluations for most of the important fusion reactor materials. A follow-up programme, including benchmark testing has been defined. Creation of a joint JEF-EFF data file has been agreed It will be compiled during 1992. (author). 20 refs.; 2 figs.; 1 tab.

30941 (EGG-M-91449) **A survey of fatigue monitoring in the nuclear power industry.** Ware, A.G. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1991]. 13p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-920631-44: American Society of Mechanical Engineers pressure vessel and piping conference, New Orleans, LA (United States), 21-25 Jun 1992). Order Number DE92017885. Source: OSTI; NTIS; INIS; GPO Dep.

The original design of nuclear power plants addressed fatigue concerns by including calculations of projected fatigue usage for specific components; the calculations were based on estimates of the number and severity of expected transients over the 40-year design life of the plants. In some cases, the transients occurring in the plants are not as severe as was anticipated in the original design analyses, while in other cases events have occurred that were not anticipated in the design basis documents. Field failures caused by fatigue have identified some of those cases. In response, several organizations in the United States and overseas have developed fatigue monitoring programs to more accurately estimate the fatigue usage. One basic approach consists of reconstructing the fatigue usage to date based on the transients recorded in the operating history instead of those projected in the design documents. Another approach includes monitoring the plant instrumentation to determine actual values for parameters such as temperature and pressure and using the measured values in the fatigue usage calculations instead of the values projected in the design documents. The use of existing plant instrumentation to measure temperature, pressure, flow rate, etc., along with the incorporation of conservative assumptions, had generally proven adequate for estimating fatigue usage; however, in some cases additional instrumentation installed for local monitoring can provide a more accurate estimate, especially where thermal stratification is known to occur. Fatigue monitoring can aid in identifying fatigue concerns not anticipated in the original design and for reducing the excessive conservatism in some of the original design calculations so that the fatigue lives of these components can be justified as they age. Fatigue monitoring can also assist efforts to reduce ongoing fatigue usage through design modifications and operating procedure changes.

30942 (EGG-M-92451) **Recommendations on frequently encountered relief requests.** Hartley, R.S.; Ransom, C.B. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 14p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-920732-7: 2. Nuclear Regulatory Commission (NRC)/American Society of Mechanical Engineers (ASME) symposium on pump and valve testing, Washington, DC (United States), 21-23 Jul 1992). Order Number DE92019761. Source: OSTI; NTIS; INIS; GPO Dep.

This paper is based on the review of a large database of requests for relief from enservice testing (1ST) requirements for pumps and valves. From the review, the paper identifies areas where enhancements to either the relief request process or the applicable test codes can improve IST of pumps and valves. Certain types of requests occur frequently. The paper examines some frequent requests and considers possible changes to the requirements to determine if the frequent requests can be eliminated. Recommended changes and their bases will be discussed. IST of safety-related pumps and valves at commercial nuclear power plants is done according to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI. Because of the design and function of some safety systems in nuclear plants, performing Code testing of certain pumps and valves is impractical or a hardship without a compensating increase in the level of safety. Deviations from the Code are allowed by law, as reviewed and approved by the United States Nuclear Regulatory Commission (NRC), through the relief request process. Because of similarities in plant design and system function, many problems encountered in testing components are similar from plant to plant. Likewise, there are often common problems associated with test methods or equipment. Therefore, many relief requests received by the NRC from various plants are similar. Identifying and addressing the root causes for these common requests will greatly improve IST.

30943 (JAERI-M--92-012, pp. 195-212) **The effects of zinc primer surfaces on iodine behaviour within containment.** Kupferschmidt, W.C.H. (Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment); Buttazoni, J.B.; Melnyk, A.J.; Portman, R.; Sanipelli, G.G. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The effects of zinc-primer-coated containment surfaces on iodine chemistry have been investigated. Intermediate-scale tests in the Radioiodine Test Facility (RTF) involving such a surface and 10^{-5} $mol{\cdot}dm^{-3}$ CsI aqueous solutions show remarkably low iodine volatility ($<2.4 \times 10^{-11}$ $mol{\cdot}dm^{-3}$). This is in part due to the reductive properties of the surface and its appreciable affinity for iodine. Up to 66% of the initial iodine inventory was found on the zinc primer surfaces at the end of each RTF test, with most of the retained iodine on surfaces in contact with the aqueous phase. Separate-effects experiments have shown that surface adsorption of iodine is greatest under aerobic alkaline conditions. The results are rationalized in terms of I^- incorporation into zinc corrosion products. (author).

30944 (JAERI-M--92-012, pp. 213-229) **Iodine chemistry in the presence of vinyl surfaces.** Kupferschmidt, W.C.H. (Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment); Buttazoni, J.B.; Evans, G.J.; Ford, B.L.; Palson, A.S.; Portman, R.; Sanipelli, G.G. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The effects of vinyl surfaces on iodine chemistry have been studied in both small-scale separate-effects tests and intermediate-scale integral experiments in the Radioiodine Test Facility (RTF). In a RTF experiment conducted without radiation in a vinyl-coated vessel, low gas phase iodine concentrations were measured ($<3.5 \times 10^{-11}$ $mol{\cdot}dm^{-3}$) and little deposition of iodine on surfaces was observed. In a similar test conducted with radiation, gas phase iodine concentrations as large as 3.5×10^{-9} $mol{\cdot}dm^{-3}$ were observed. This coincided with dramatic decreases in pH and dissolved oxygen concentrations. In addition, at least 67% of the iodine inventory was retained on surfaces, primarily those exposed to the gas phase. The separate-effects studies suggest that the pH, dissolved oxygen and iodine volatility behaviour in the RTF radiation test can be attributed to radiolytic decomposition of organics originating from the organic-based coating. Additional experiments indicate that iodine volatility can be minimized, even in the presence of vinyl surfaces and aqueous phase organics, if alkaline pH conditions are maintained. (author).

30945 (JAERI-M--92-012, pp. 280-297) **Large-scale experiments on iodine release associated with coolant flashing due to ruptured high-pressure tubes.** Hellmann, S. (Siemens AG Unternehmensbereich KWU, Erlangen (Germany)); Bleier, A.; Rippel, R.; Morell, W.; Funcke, J. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Large-scale experiments were performed in order to study the radionuclide release especially of iodine associated with coolant flashing in the case of a ruptured high-pressure tube. It was investigated how radionuclides such as non-volatile iodine I^-, cesium, Cs^+ and volatile iodine I_2 dissolved in a coolant at pH 6 distribute in the water and steam phases and to what extent they are released from a compartment. Experimental parameter studies include: the effect of discharge geometry on the release of droplet-borne radionuclides (Li^+-tracer), the influence of volatile and non-volatile iodine fractions on iodine release (I^-/I_2-tests using radio-iodine tracer I123). Additionally, some essential aspects of long-term behavior of iodine (release from sumps) were covered. The experimental results show that the release is in any case below 1 %. The highest values are obtained when the discharged two-phase jet impacts directly on an impingement plate. In the case of non-volatile iodine (I^-) the same release as with Li^+-tracer is obtained, leading to the conclusion that release of iodine takes place only by droplet carry-over. The use of volatile iodine (I_2) does not significantly raise the release compared to a purely droplet-borne iodine release. This can be explained by the chemical behaviour of I_2 under the prevailing conditions. Thus the overall release is clearly dominated by the droplet-borne fraction. The long-term release of iodine from sumps at pH 6 - 6,5 is also negligibly small: a theoretical treatment based on measured partition coefficients yielded a release < 0.1 % within 10 hours. (author).

30946 (JAERI-M--92-012, pp. 431-445) **Improvement and validation of tellurium transport models in the RAFT code.** Gonzalez, C. (Universidad politecnica de Madrid (Spain)); Alonso, A. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The European Communities, within the Shared Cost Action on Reactor Safety 1988-1991 Programme, has been sponsoring a study on the Chemical Behaviour of Tellurium Species in the Reactor Pressure Vessel and the Reactor Cooling System under Severe Accident Conditions, which has been performed at the Chair of Nuclear Technology, Madrid Polytechnical University. Apart from compiling a state-of-the-art report, including as assessment of the capabilities of transport codes, a validation/improvement effort on tellurium chemistry model in the RAFT code was undertaken. The improvement consisted in the inclusion of new tellurium species, and of a simple model for the interaction of the tellurium with silver aerosols. The validation consisted in the analysis of the MARVIKEN 4 and 7 experiments with the modified/improved versions of RAFT 1.0 and RAFT 1.1. It was found that the presence of silver aerosols reduces the vapour pressure of Te_2 and modifies its deposition mechanisms. (author).

30947 (NUREG/CR--4819-Vol.2) **Aging and service wear of solenoid-operated valves used in safety systems of nuclear power plants: Volume 2, Evaluation of monitoring methods.** Kryter, R.C. (Oak Ridge National Lab., TN (United States)). Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Oak Ridge National Lab., TN (United States). Jul 1992. 87p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/TM--12038-Vol.2). Source: OSTI; NTIS; INIS; GPO.

Solenoid-operated valves (SOVS) were studied at Oak Ridge National Laboratory as part of the US Nuclear Regulatory Commission Nuclear Plant Aging Research (NPAR) Program. The primary objective of the study was to identify, evaluate, and recommend methods for inspection, surveillance, monitoring, and maintenance of SOVs that can help ensure their operational readine--is, their ability to perform required safety functions under all anticipated operating condition--because, under certain circumstances, failure of one of these small and relatively inexpensive devices could have serious consequences. An earlier (Phase I) NPAR Program study described SOV failure modes and causes and identified measurable parameters thought to be linked to the progress of degradations that may ultimately result in functional failure of the valve. Using this earlier work as a guide, the present (Phase II) study focuses on devising and then demonstrating the effectiveness of performance-measuring techniques and equipment that show promise for detecting and trending the progress of such degradations before they reach a critical stage. Intrusive techniques requiring the addition of magnetic or acoustic sensors or the application of special test signals were investigated briefly, but major emphasis was placed on the examination of condition-indicating techniques that can be applied with minimal cost and impact on plant operation.

30948 (PNL-SA-19682) **ASTM international symposium on small specimen test techniques and their applications to pressure vessel annealing and plant life extension.** Garner, F.A. (Pacific Northwest Lab., Richland, WA (United States)); Hamilton, M.L.; Heinisch, H.L.; Kumar, A.S. Pacific Northwest Lab., Richland, WA (United States). Jan 1992. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920146-5: ASTM international symposium on small specimen test techniques and their applications to nuclear reactor vessel thermal annealing and plant life extension, New Orleans, LA (United States), 29-31 Jan 1992). Order Number DE92019080. Source: OSTI; NTIS; INIS; GPO Dep.

Miniature sheet-type tensile specimens are currently being used in a variety of radiation damage studies conducted in a number of different reactors. Although these specimens are very small, they have proven successful in addressing issues encountered in both thermal reactors and anticipated fusion reactors. This paper reviews the results of a number of recent studies that illustrate the range of applicability of these small specimens. When combined with other types of specimens and other types of measurements made prior to tensile testing, miniature tensile specimens have been found to serve as very useful tools for application to both fundamental studies and alloy screening studies.

30949 (SA-FOU-91-09) **Application of probabilistic fracutre mechanics to allocation of NDT for nuclear pressure vessels.** Bergman, M. (Swedish Plant Inspectorate, Stockholm (Sweden)); Brickstad, B.; Dillstroem, P.; Nilsson, F. Swedish Plant Inspectorate, Stockholm (Sweden). Aug 1991. 34p. Order Number DE92644343. Source: OSTI; NTIS; INIS.

In order to study whether there are considerable differences in fracture probability between different regions in a reactor pressure vessel a limited probabilistic fracture mechanics (PFM) study is carried out. Two different regions (crack geometries) are considered and the fracture and leakage probabilities are calculated for a number of load cases. The loading is assumed to be deterministic while most of the other quantities are assumed to be of random character. The fracture probabilities are very dependent of assumption made for the fracture toughness distribution, but the mutual order of the fracture probabilities of the two regions seemed to be relatively unaffected by this. Of the transients considered, the cold overpressurization event is by far the most dangerous even. A sensitivity analysis shows however that this result is heavily dependent of the transition temperature of the material. The leakage probabilities are in most cases much lower than the fracture probabilities indicating that consequence considerations are not very important for NDT allocation purpose. (au).

30950 (WSRC-MS-92-193) **Effluent versus inlet header break analysis for SRS-reactor LOPA scenario.** Paul, P.K.; Barbour, K.L.; Herman, D.T. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921102-7: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92016850. Source: OSTI; NTIS; GPO Dep.

The Loss-of-Pumping Accident (LOPA) is a design basis accident for the Savannah River Site (SRS) reactors. The LOPA is defined as a Double Ended Guillotine Break (DEGB) in a secondary cooling water pipe. The secondary cooling line break is termed inlet or effluent depending on break location. Upon break detection emergency shut down procedure begins, the reactor scrams, secondary cooling pump motors trip off, primary cooling pump AC motors switch off, and DC motor drive engages. Secondary cooling gravity flow continues flooding the building after secondary cooling pumps are off. The Emergency Cooling System (ECS) activates before the DC motors flood out. Break detection time, header flooding rate, and flooding locations are different for the inlet and effluent header breaks due to different break locations. Inlet and effluent header break primary coolant temperature transients differ because primary and secondary cooling pumps continue during a break detection and reactor scram time delay for the effluent header case, whereas the pumps trip off almost immediately for the inlet header case. Design basis accident reactor core power limits are calculated for both the inlet and effluent header breaks.

2203 Fuel Elements

Refer also to citation(s) 30902, 31029, 32506

30951 (CNIC-00420) **A nondestructive testing device for determining ^{235}U enrichment in power reactor fuel elements.** Liu Lanhua (Fifth Research and Design Inst. of China National Nuclear Corporation, Zhengzhou, HEN (China)); Liu Nangai. China Nuclear Information Centre, Beijing, BJ (China). Jul 1990. 8p. (In Chinese). (FRDIN-0004.). Order Number DE93602048. Source: OSTI; NTIS (US Sales Only); INIS.

The development and application of a nondestructive testing device are presented, which is used for determining the ^{235}U enrichment in the mixed fuel of fuel elements with UO_2 pellets. The testing efficiency is improved because the passive gamma ray method and a hole-bored NaI crystal and four channel multichannel analyzer are used. The false discrimination rate is reduced as the average comparing method is taken. This device is simple in structure and easy in operation. It has provided a new testing tool for the fuel elements production in China. This device has successfully been used in Qinshan Nuclear Power Plant in testing its fuel elements.

30952 (CNIC-00444) **Nondestructive testing of bonding of low enriched uranium elements by using ultrasonic phase-amplitude technique.** He Fengqi (Southwest Inst. of Nuclear Reactor Engineering, Sichuan, SC (China)). China Nuclear Information Centre, Beijing, BJ (China). Sep 1990. 10p. (SINRE-0023.). Order Number DE93602049. Source: OSTI; NTIS (US Sales Only); INIS.

The theoretical analysis and calculation for the amplitude and phase of ultrasonic echoes from the bonding layers of low enriched fuel elements are introduced. The effect of different bonding rates on the amplitude and phase is also described. The analytical result shows that in the evaluation of bonding quality using ultrasonic technique, the phase information of echoes should not be neglected because there is a considerable acoustic property difference between the fuel can and fuel core, and for the correctness the broadband phase-amplitude analytical technique must be employed. A new ultrasonic testing system has been developed and the testing results from the system is in good agreement with the theoretical analysis. The technique is also used successfully to test other bonding structures made from different acoustic materials.

30953 (JAERI-M-92-044) **Reassessment of fuel failure behavior in the SPERT and PBF experiments for irradiated fuel rods under reactivity initiated accident conditions.** Homma, Kozo (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Ishijima, Kiyomi; Fujishiro, Toshio. Japan Atomic Energy Research Inst., Tokyo (Japan). Apr 1992. 332p. (In Japanese). Order Number DE93703572. Source: OSTI; NTIS; INIS.

The current safety guideline for the evaluation of postulated reactivity initiated events in light water reactors was established by the Nuclear Safety Commission in January, 1984 on the basis of the experimental results from the NSRR program using fresh fuels. As for the burnup effects on fuel failure, the results of the previous American SPERT-CDC experiments were considered in the guideline. However, failure threshold and failure mechanism for preirradiated fuel rods were not established because only a few irradiated fuel rods were tested. Experiments with preirradiated fuel rods are now in progress as the next major research items in the

NSRR program. This paper presents behavior of fuel failure for irradiated fuel rods under reactivity initiated accident conditions. Results from the previous SPERT and PBF experiments which should be compared with the experiments of the NSRR program are reviewed. The modes of fuel failure in the SPERT and PBF experiments were different from those in the experiments with fresh fuels. Cladding rupture and PCMI failure came out in the SPERT experiments, Cladding rupture in the SPERT experiments might be related to a FP gas release during both preirradiation and power burst. The rod with burnup of 31,800 MWd/t and total energy of 190 cal/g·UO$_2$ in the SPERT experiments failed at low energy deposition (85 cal/g·UO$_2$) with PCMI. The observed cracks appeared to be brittle fractures along the whole active length of the rod. The failure of this ROd was probably related to the cladding embrittlement by the excessive corrosion during preirradiation. Moreover, relationship between supposed failure mechanisms and influencing factor for generally irradiated fuel rod under reactivity initiated accident conditions is discussed. (author).

2204 Control Systems

Refer also to citation(s) 30941, 31006, 31011, 31039

30954 (CNIC-00346) **Machining technology for spider of control assembly.** Wang Yinju (Yibin Nuclear Fuel Element Plant, SC (China)); Hou Quanxiang; Wen Xianbing; Li Tongjun. China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 6p. (In Chinese). (NFE-0003.). Order Number DE93602057. Source: OSTI; NTIS (US Sales Only); INIS.

An introduction to the technology for machining the spider used in the control assembly for nuclear power plant is given. The trapezoidal slots of the spider is machined by a combined contour turning tool, the 2 holes of $\phi 7_{-0}^{+0.002}$ x 30 mm by a contour boring tool and the star structure by digital control line cutting machine. The technology has been applied in production successfully.

30955 (CNIC-00455) **Radiation monitor system for nuclear power plants.** Wu Bingzhe (Xian Nuclear Instrument Factory, SN (China)); Guo Shusheng. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 15p. (In Chinese). (XNIF-0002.). Order Number DE93602058. Source: OSTI; NTIS (US Sales Only); INIS.

The system has 8 kinds of radiation monitors and 2 stage microcomputers designed for processing the data from each monitor, storaging the information, printing out and displaying on the colour CRT. The function of the system includes high-value alarm, warm alarm and failure alarm, so called 'three-level alarms' Two functions of the alarms are the threshold alarm and the tendency alarm, so that this system is an intelligency system. This system has high reliability and very wide range when LOCA accident takes place. It is aseismic and immune to industrial interference. The system can meet IEC-761-1 standard and is of nuclear safety 3rd class. Also the following monitors were designed: ^{133}Xe monitor, ^{131}I monitor, low-level liquid monitor and high radiation γ area monitor. The system can meet the requirements of nuclear power plants.

30956 (CONF-921048-4) **Advanced control room design review guidelines: Merging old and new.** Carter, R.J. (Oak Ridge National Lab., TN (United States)); Wachtel, J.A. Oak Ridge National Lab., TN (United States). [1992]. 9p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC05-84OR21400. From Human Factors Society (HFS) annual meeting; Atlanta, GA (United States); 12-16 Oct 1992. Order Number DE92019212. Source: OSTI; NTIS; INIS; GPO Dep.

The nuclear power industry is currently developing operator interface systems based on innovative applications of digital computers. To assure that this advanced technology is incorporated in a way that maximizes the potential safety benefits of the technology and minimizes the potential negative effects on human performance, human factors principles must be considered. NUREG-0700 contains guidelines for the review of operator interfaces. However, in light of the rapid technological advances in digital technology which have taken place in the eleven years since its publication, it is no longer adequate to assess the rapidly changing human-system interfaces. A research program, the purpose of which is to upgrade NUREG-0700, has been initiated. Thus far a set of draft advanced control room design review (ACRDR) guidelines has been complied. Three tasks, which were oriented towards integrating the applicable guidelines in NUREG-0700 into the ACRDR document, are described in the paper.

30957 (DOE/ER/12819-T2) **Installation and evaluation of a nuclear power plant operator advisor based on artificial intelligence technology: Interim progress report and second year development plan.** Hajek, B.K.; Miller, D.W. Ohio State Univ., Columbus, OH (United States). Nuclear Engineering Program. 20 Jun 1989. 81p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG07-88ER12819. Order Number DE92019527. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics on a Nuclear Power Plant operator advisor based on artificial Intelligence Technology; Workstation conversion; Software Conversion; V&V Program Development Development; Simulator Interface Development; Knowledge Base Expansion; Dynamic Testing; Database Conversion; Installation at the Perry Simulator; Evaluation of Operator Interaction; Design of Man-Machine Interface; and Design of Maintenance Facility.

30958 (DPW-6545) **Project 8980: Savannah River Plant control rod actuators.** Tinker, J.B. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 16 Oct 1952. 1p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H-163). Order Number DE92019117. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This memorandum discusses the control rod actuator design for the R,L,P,K, and C reactors. Both the position-demand and the position-indicating systems are discussed in terms of procurement, testing, and installation. (FI)

30959 (ECN-RX-91-044) **Failure detection studies by layered neural network.** Ciftcioglu, O. (Istanbul Technical University (Turkey). Electrical Engineering Faculty); Seker, S.; Turkcan, E. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jun 1991. 13p. (CONF-9105380-: International AMSE Conference Neural Networks, San Diego CA (United States), 29-31 May 1991). Order Number DE93602061. Source: OSTI; NTIS; INIS.

To be published in the Proceedings of International AMSE Conference Neural Networks, 29-31 May 1991, San Diego, USA.

Failure detection studies by layered neural network (NN) are described. The particular application area is an operating nuclear power plant and the failure detection is of concern as result of system surveillance in real-time. The NN system is considered to be consisting of 3 layers, one of which being hidden, and the NN parameters are determined adaptively by the backpropagation (BP) method, the process being the training phase. Studies are performed using the power spectra of the pressure signal of the primary system of an operating nuclear power plant of PWR type. The studies revealed that, by means of NN approach, failure detection can effectively be carried out using the redundant information as well as this is the case in this work; namely, from measurement of the primary pressure signals one can estimate the primary system coolant temperature and hence the deviation from the operational temperature state, the operational status identified in the training phase being referred to as normal. (author). 13 refs.; 4 figs.; 2 tabs.

30960 (ECN-RX-91-106) **The standard molar enthalpies of formation of BaSiO$_3$(s) and Ba$_2$SiO$_4$(s).** Huntelaar, M.E. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Cordfunke, E.H.P.; Ouweltjes, W. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Nov 1991. 11p. Order Number DE93602062. Source: OSTI; NTIS; INIS.

To be published in Journal of Chemical Thermodynamics.

The enthalpies of solution BaSiO$_3$ and Ba$_2$SiO$_4$ in (3.15 mol·dm^{-3} HF+3.13 mol·dm^{-3} HCl) have been measured. From the results the standard molar enthalpies of formation of BaSiO$_3$(s) and Ba$_2$SiO$_4$(s) have been calculated. The values obtained are -(1606.4±2.6) kJ·mol^{-1} and -(2292.2± 4.2) kJ·mol^{-1}, respectively. (author). 6 refs.; 5 tabs.

30961 (ECN-RX-91-110) **Studies on signal validation and sensor surveillance for in-core signals in NPP: Paper presented at the NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburg, Pennsylvania, USA, 1-4 October 1991.** Ciftcioglu, O. (Istanbul Technical University (Turkey). Electrical Engineering Faculty); Turkcan, E. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Dec 1991. 16p. (CONF-9110414-: NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburgh PA (United States), 1-4 Oct 1991). Order Number DE93602063. Source: OSTI; NTIS; INIS.

Signal validation and sensor failure detection are two essential tasks to be carried out continuously in an operating reactor. Towards this aim, an optimal filtering approach for in-core NPP signals is implemented. The method concerns the specific measured input signal information as a parameter state and they are estimated by means of Kalman filtering technique. The signal validation and sensor surveillance system comprise filters as many as the states being considered and each filter receives all the measured signals as inputs in such a way that each filter in hand is desensitized to one of the individual input signals relative to others. In case of no failure of sensors all the filter outputs are identical. Each sensor output is tested by means of corresponding estimate present at the output of that filter which is desensitized to the sensor being tested. The comparison test is carried out continuously in real-time and any significant deviation noted during the test process is identified to be a sensor failure together with the faulty sensor. The method is investigated by means of real plant data of the in-core neutron detectors and core-inlet and outlet thermocouples of the Borssele nuclear power plant. The method has proven to be effective for fast and reliable in-core sensor failure detection as well as for in-core signal validation in normal operation indicating its further effectiveness for model validation applications in nuclear power plants. (author). 17 refs.; 4 figs.; 1 tab.

30962 (NUREG/CR-6001) **Aging assessment of BWR standby liquid control systems.** Buckley, G.D. (Pacific Northwest Lab., Richland, WA (United States)); Orton, R.D.; Johnson, A.B. Jr.; Larson, L.L. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Pacific Northwest Lab., Richland, WA (United States). Aug 1992. 28p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC06-76RL01830. (PNL-8020). Source: OSTI; NTIS; INIS; GPO.

Pacific Northwest Laboratory conducted a Phase I aging assessment of the standby liquid control (SLC) system used in boring-water reactors. Tne study was based on detailed reviews of SLC system component and operating experience information obtained from the Nuclear Plant Reliability Database System, the Nuclear Document System, Licensee Event Reports, and other databases. Sources on sodium pentaborate, borates, and boric acid, as well as the effects of environment and corrosion in the SLC system were also reviewed to characterize chemical properties and corrosion characteristics of borated solutions. Relatively few SLC component failures were attributed to sodium pentaborate buildup or corrosion. The leading aging degradation concern to date appears to be setpoint drift in relief valves, which has been discovered during routine surveillance and is thought to be caused by mechanical wear. A higher setpoint results in loss of system overpressure protection, and a decrease in setpoint results in a reduction of boron injection rate. Degradation was also observed in pump seals and internal valves, which could prevent the pumps from operating as required by the technical specifications. In general, however, the results of the Phase I study indicate that age-related degradation of SLC systems has not been serious.

30963 (WSRC-MS-92-180) **Cadmium safety rod thermal tests.** Thomas, J.K.; Iyer, N.C.; Peacock, H.B. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921102-5: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92015883. Source: OSTI; NTIS; INIS; GPO Dep.

Thermal testing of cadmium safety rods was conducted as part of a program to define the response of Savannah River Site (SRS) production reactor core components to a hypothetical LOCA leading to a drained reactor tank. The safety rods are present in the reactor core only during shutdown and are not used as a control mechanism during operation; thus, their response to the conditions predicted for the LOCA is only of interest to the extent that it could impact the progression of the accident. This document provides a description of this testing.

2205 Environmental Aspects

Refer also to citation(s) 30711, 30871, 30872, 30875, 30895, 30919, 30945, 30950, 31018, 31028, 31669, 31670, 31757, 32530, 32535, 32544, 32546, 32547, 32551

30964 (CNIC-00544) **Radiological environmental quality assessment of the nuclear industry in China over the past 30 years.** Pan Ziqiang (Bureau of Safety, Protection, Environment and Health, China National Nuclear Corporation, Beijing, BJ (China)); Wang Zhibo. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 40p. (In Chinese). (BSPHN-0004.). Order Number DE93601736. Source: OSTI; NTIS (US Sales Only); INIS.

The nuclear industry has become a comprehensive industrial system in China since its foundation in 1955, for which the radiation assessment began in 1981. Up to the extent of 80 km from each facility, investigation of population, crop distribution and dietary has been made. Meteorological, hydrological and geological data as well as affluents and environment monitoring data have been obtained and analyzed. All the evaluation was performed through Y3001 computer code. According to the results, the effective dose equivalents to all the critical groups near the nuclear facilities are below the dose limits. The doses to about 80% of the critical groups are less than 1/10 of those caused by natural radiation. The total annual average collective effective dose equivalent resulted from the system of nuclear industry is 23 man · Sv, which is less than 0.01% of that from natural radiation and far below the detriment resulted from nonnuclear industries or other human activities. According to the nuclear industry programs of China, in the year of 2000, it is estimated that the total annual collective effective dose equivalent resulted from the system of nuclear industry is 59 man · Sv.

30965 (INIS-mf-13215, pp. 31-46) **The environmental effects of the nuclear accidents in Chernobylsk (1986) and in the Ural mountains.** Litai, D. (Israel Atomic Energy Commission, Tel Aviv (Israel)). Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359-: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

The nuclear accidents, in Chernobylsk and in the Ural plutonium plant, are described. Their environment effects, and the emergency and remedial action are reviewed.

30966 (ORNL/TM-11882, pp. 153-161) **Anticipated radiation environmental effect from the Moscow Kaon Factory.** Kopeikin, I.N. (Inst. for Nuclear Research, Moscow (Russian Federation)); Serezhnikov, S.V.; Stepanov, V.E. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The radiation effects anticipated from Moscow Kaon Factory (the synchrotron with 45 Gev proton energy and 125 μA average current being designed now) have been evaluated by estimating effective dose equivalents which would be received by the public from radiation exposure attributable to the installation. Dose rate conversion factors of all radionuclides produced from air by high energy nucleons have been calculated for inhalation, ingestion and external exposure. Radioactivity emission rate and composition of released mixtures at different designs and modes of operation have been considered. The contribution of various radionuclides varies widely: the contribution of the short-lived radioactive gases

C-11, N-13 - from 4% to 98%; the contribution of Ar-41 - from 2% to 60% and the contribution of other radionuclides Be-7, Na-22, Na-24, Al-28, P-32, S-37, Cl-38, Cl-39, etc. - from 4% to 80%. To evaluate the radiation environmental effect of releasing long-lived radionuclides Be-10, C-14, Al-26, Si-32, Cl-36, Ar-39, the ratios of their emission rates from the Kaon Factory to corresponding production rates in the atmosphere due to cosmic rays have been evaluated. It was shown that the ratios do not exceed 0.01%.

30967 (RL-REA–922) **Preliminary investigation of water coagulation characteristics as affects reactor effluent radionuclides.** Frymier, J.W. General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation. 15 Apr 1965. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019151. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Several theories have been advanced regarding the structure and characteristics of the aluminum hydroxide molecule when produced from alum in the water treatment process. The Water Treatment Task Force initiated this test to exploit a theory that increased adsorption of soil-leached elements, present in Columbia River water, by the floc particle would occur when the precipitate vas formed in its terminal pH state. This report discusses a half-plant test which was initiated at E Reactor Plant wherein the total sulfuric acid for pH correction was added with the alum to evaluate its affect on reactor effluent radionuclides.

30968 (SCPRI-RM–12-1991) **Monthly results of measurements; December 1991.** Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France). 1991. 60p. (In French). Order Number DE92566709. Source: OSTI; NTIS (US Sales Only); INIS.

This report of the SCPRI exposes the principal results concerning the routine monitoring of environmental radioactivity in France: atmospheric dusts, rainwater, surface water, underground water, sewage water, drinking water, food chain (milk, vegetables, fishes), sea water around nuclear sites and other sites. The activities of various radioisotopes are presented in tables.

2206 Research, Test, Training, Production, Irradiation, Materials Testing Reactors

Refer also to citation(s) 30635, 30685, 30755, 30781, 30902, 30958, 30963, 30967, 31006, 31007, 31010, 31011, 31028, 31033, 31034, 31035, 31037, 31038, 31039, 31040, 31330

30969 (BNWL-CC–224-Add.) **An evaluation of Hanford water treatment practices addendum.** Touhill, C.J. Pacific Northwest Lab., Richland, WA (United States). May 1965. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019153. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This is an addendum to the unclassified document entitled, "An Evaluation of Hanford Water Treatment Practices." All classified data pertinent to the above document have been included here for reference. Data tables include chlorine demand (1964); chlorine contact times for reactor areas; calculation of flocculation; flow velocity in flocculation basins; overflow velocity; and particle removal efficiency; and filtration and backwash flow rates.

30970 (CNIC–00363) **The experimental determination of the primary system resistance for 5MW heating test reactor.** Li Rizhu (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Han Bing; Bi Shuxun; Tong Yunxian; Liu Zhiyong. China Nuclear Information Centre, Beijing, BJ (China). Nov 1989. 11p. (In Chinese). (TSHUNE–0012.). Order Number DE93602138. Source: OSTI; NTIS (US Sales Only); INIS.

The experimental determination of the inlet resistance coefficients of fuel assembly as well as the primary side resistance of primary heat exchanger for 5MW heating test reactor is described. The primary system of the reactor is designed as integrated arrangement and natural circulation, its main resistance comes from the inlet section of fuel assembly and the primary heat exchanger, therefore, it is important to experimentally determine the corresponding resistance coefficients for the hydraulic and construction design of the reactor. The tested fuel assembly and the inlet structure of the reactor core have been designed the same size as those of 5MW heating test reactor. This hydrodynamic test system operated in room-temperature and low pressure condition. It is controlled by the throttle valves that regulate flow and operational condition. The resistance coefficients for three kinds of fuel assemblies to be used in 5MW heating reactor have been determined. The tested model of main heat exchanger is made of plexiglass. The size of model and primary heat exchanger are in a ratio 1:2. The result of test that the primary side resistance coefficient of primary heat exchanger for 5MW heating test reactor is 145. The primary system resistance meets the requirements of hydrodynamic design for a integrated arrangement and natural circulation heating reactor.

30971 (CNIC–00478) **Level 1 probabilistic safety assessment on swimming pool reactor at IAE.** Li Zhaohuan (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy). China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 13p. (IAE–0088.). Order Number DE93602139. Source: OSTI; NTIS (US Sales Only); INIS.

A study of level 1 probabilistic safety assessment (PSA) on the Swimming Pool Reactor (SPR) which has been operated for 24 years at Institute of Atomic Energy(IAE) is presented. The main purpose of this analysis is to evaluate its integral safety of continuing operation. The analysis is completed in accordance with the PSA procedure guides. The following points are especially concerned. (1) Get to be familiar with the safety related systems and operating experience of the reactor; (2) Check and inspect the status of operating facilities including rarely used but important facilities for mitigating of accident; (3) Establish success criteria for accident sequence modelling; (4) Use a simple Markov model to analyse the redundant devices; (5) Carefully consider the human factor errors because human factor plays an important role in the safety operation of SPR; (6) Besides computing uncertainty, recovery, importance and sensitivity, the EXSETS code was developed to enhance level 1 PSA calculation; (7) Consider the recovery action, which is very important for support system in the post-accident. This analysis is able to improve the management and operators training. A more specific calculation will be carried out in the future because the data collection is under way.

30972 (CNIC–00540) **Irradiation surveillant test of High Flux Engineering Test Reactor (HFETR) pressure vessel.** Gao Weisen (China Nuclear Power Inst., Chengdu, SC (China)); Cui Yonghai. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 6p. (In Chinese). (SINRE–0031.). Order Number DE93602140. Source: OSTI; NTIS (US Sales Only); INIS.

The result of irradiation surveillant test of HFETR pressure vessel is presented. It shows that after 3.3 x 10^{20} n/cm^2 irradiation the irradiation brittleness effect in welding seam (ws) is smaller than in heat-affected zone (HAZ), and the irradiation brittleness effect in HAZ is smaller than in base material (BM). From the view point of irradiation brittleness, under present operation conditions of the HFETR, the safety margin of plasticity and toughness in the WS, BM and HAZ is sufficient within the design life of the reactor.

30973 (CONF-921110–2) **Fuel plate stability experiments and analysis for the Advanced Neutron Source.** Swinson, W.F.; Battiste, R.L.; Luttrell, C.R.; Yahr, G.T. Oak Ridge National Lab., TN (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Winter annual meeting of the American Society of Mechanical Engineers; Anaheim, CA (United States); 8-13 Nov 1992. Order Number DE92008013. Source: OSTI; NTIS; INIS; GPO Dep.

The planned Advanced Neutron Source (ANS) and several existing reactors use closely spaced arrays of involute shaped fuel-plates which are cooled by water flowing through the channels between the plates. There is concern that at certain coolant flow velocities adjacent plates may deflect and touch, with resulting failure of the plates. Experiments have been conducted at the Oak Ridge National Laboratory to examine this potential phenomenon. Results of the experiments and comparison with analytical predictions are reported in this paper. The tests were conducted using full scale epoxy plate models of the aluminum/uranium silicide ANS involute shaped fuel plates. Use of epoxy plates and model theory allowed lower flow velocities and pressures to explore the potential failure mechanism. Plate deflections and channel pressures as function of the flow velocity are examined. Comparisons with mathematical models are noted. 12 refs.

30974 (DOE/ER/75360–4) **Low enrichment fuel conversion for Iowa State University: Progress report, August 1, 1991–July 31, 1992.** Rohach, A.F. Ames Lab., IA (United States). Aug 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER75360. Order Number DE92019513. Source: OSTI; NTIS; GPO Dep.

This report discusses the UTR-10 reactor at Iowa State University which went critical on low enriched uranium (LEU) fuel on August 14, 1991. However, subsequent to the criticality experiments the fuel plates started to discolor. In addition, roll pins used to lift the fuel assemblies were discovered to be cracked. It was determined that these problems were due to chemical agents in the primary coolant water. The roll pins were replaced by solid stainless steel pins. The primary coolant was replaced and the reactor is currently in operation. Surveillance specimens will be used to monitor any possible future discoloration. The high enriched fuel (HEU) is being prepared for eventual shipment to a high enriched fuel receiving facility.

30975 (DOE/RW–0184-R1-Vol.2) **Characteristics of potential repository wastes: Volume 2.** Oak Ridge National Lab., TN (United States). Jul 1992. 156p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–2217-Vol.2). Source: INIS; OSTI (Free of Charge).

The LWR spent fuels discussed in Volume 1 of this report comprise about 99% of all domestic non-reprocessed spent fuel. In this report we discuss other types of spent fuels which, although small in relative quantity, consist of a number of diverse types, sizes, and compositions. Many of these fuels are candidates for repository disposal. Some non-LWR spent fuels are currently reprocessed or are scheduled for reprocessing in DOE facilities at the Savannah River Site, Hanford Site, and the Idaho National Engineering Laboratory. It appears likely that the reprocessing of fuels that have been reprocessed in the past will continue and that the resulting high-level wastes will become part of defense HLW. However, it is not entirely clear in some cases whether a given fuel will be reprocessed, especially in cases where pretreatment may be needed before reprocessing, or where the enrichment is not high enough to make reprocessing attractive. Some fuels may be canistered, while others may require special means of disposal. The major categories covered in this chapter include HTGR spent fuel from the Fort St. Vrain and Peach Bottom-1 reactors, research and test reactor fuels, and miscellaneous fuels, and wastes generated from the decommissioning of facilities.

30976 (DPSP–70-1096) **Inspection of irradiated Mark 18 fuel tubes.** Harpring, J.R. Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States). Savannah River Lab. 3 Mar 1970. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001 ;AC09-89SR18035. Order Number DE92019635. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This report summarizes the inspections made of failed and unfailed irradiated Mark 18 outer fuel tubes in K-Area basin using the underwater periscope. Mark 18 drivers are being used in the production of Cf-252 in K Area. (JL)

30977 (DPW–6485) **Scintillation counter: Moderator purification.** Heston, W.M. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 24 Oct 1952. 1p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–160). Order Number DE92019112. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This memorandum discusses the purification of moderators contaminated by ruptured fuel slugs. (JL)

30978 (DPW–6546) **Technical Section Coordinating Committee meeting.** Bloomsburg, M.S. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 4 Nov 1952. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–147). Order Number DE92018670. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Short communication. SAVANNAH RIVER PLANT/reactor technology; PRODUCTION REACTORS; MEETINGS; REACTOR COMPONENTS; HEAT TRANSFER; HYDRAULICS; REACTOR COOLING SYSTEMS; HYDROGEN SULFIDES

30979 (DPW–6643) **Reactor shield tests.** Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). 18 Nov 1952. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–150). Order Number DE92018673. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This document details the request that a mocked-up section of the CP6 thermal shield be tested in the Lid Tank Shielding Facility at Oak Ridge. (FI)

30980 (DUN–2634-RD) **Reactor operations daily reports, July 1, 1967–June 30, 1968.** DeNeal, D.L. Douglas United Nuclear, Inc., Richland, WA (United States). 1 Jul 1967. 525p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92040332. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This document provides the reactor operations daily reports for the period of July 1, 1967 through June 30, 1968. (FI)

30981 (DUN–4440-RD) **Reactor Operations daily reports, July 1, 1968–August 31, 1968: Rough draft.** DeNeal, D.L. Douglas United Nuclear, Inc., Richland, WA (United States). 1 Jul 1968. 65p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019148. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This document provides daily operations reports for the period of July 1, 1968 through August 31, 1968. (FI)

30982 (ECN-I–91-068) **Neutron metrology in the HFR: Steel irradiation R139-416.** Polle, A.N.; Voorbraak, W.P. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Nov 1991. 35p. Order Number DE93602144. Source: OSTI; NTIS; INIS.

The experiment R-139-416 for testing the stainless steel type 316L(N) has been irradiated in the HFR Petten. This report presents the final metrology results obtained from activation monitors near the CT-specimen (Compact Tension). Data about the helium production as well as the number of displacements per atom are also included. The irradiation conditions for this experiment, carried out in a REFA-170 type capsule in the HFR position H8, are as close as possible to the conditions of the EFR (European Fast Reactor) above-core structures. The main results of the thermal and fast neutron fluence measurements are presented in table 1 and in figure 1. (author). 10 refs.; 2 figs.; 11 tabs.

30983 (ECN-I–92-012) **Neutron metrology in the HFR: Steel irradiation in the HFR R139-656.** Baard, J.H.; Voorbraak, W.P. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Apr 1992. 28p. Order Number DE93602145. Source: OSTI; NTIS; INIS.

Various steel irradiations have been performed in the HFR, as part of a testing program for fusion reactor construction materials. This report presents the metrology results obtained from the activation monitors in the steel irradiation experiment R139-656. This experiment, which has been irradiated in HFR Petten, has been used to investigate the stainless steel type MANET-I. Data about the helium production as well as the number of displacements per atom are also included. The irradiation has been carried out in a TRIO type capsule in HFR position D2. The main results of thermal and fast neutron fluence measurements are presented. (author). 12 refs.; 1 fig.; 12 tabs.

30984 (HW–12283) **Analytical services - Pile area laboratories.** Curtis, R.E. Hanford Works, Richland, WA (United States). 28 Jan 1949. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019155. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This is a report on Analytical Services of the Pile Area Laboratories at Hanford. Pertinent facts are listed regarding the analytical services currently provided by the Analytical Section in the pile areas. The work of the Analytical Section in the pile areas may be classified into five categories as follows: Analysis of pile process water, analysis of power plant (boiler) waters, analysis of drinking water, analysis of columbia (non-process) and Yakima River water, and preparation of reagents and standard solutions.

30985 (HW–38375-Del.) **Hanford Atomic Products Operation monthly report, July 1955.** General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation. 26 Aug 1955. 362p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019305. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This document presents a summary of work and progress at the Hanford Engineer Works for July 1955. The report is divided into sections by department. A plant wide general summary is included at the beginning of the report, after which the departmental summaries begin. The Manufacturing Department reports plant statistics, and summaries for the Metal Preparation, Reactor and Separation sections. The Engineering Department's section summarizes work for the Technical, Design, and Project sections. Costs for the various departments are presented in the Financial Department's summary. The Medical, Radiological Sciences, Utilities and General Services, Employee and Public Relations, and Community Real Estate and services departments have sections presenting their monthly statistics, work, progress, and summaries.

30986 (HW–38808) **Interim report - Production Test MR-105-12 crossheader purge with chromic acid.** Hardin, A.K. Hanford Atomic Products Operation, Richland, WA (United States). 19 Sep 1955. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019174. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The primary purpose of this test was to demonstrate that the inside of a rear-cross-header, its nozzles and pigtails could be decontaminated by recirculating for 30 minutes, a 60° C, O.3 pH chromic acid solution. Secondary purposes were, (1) to determine the magnitude of radiation increase in piping and acid equipment external to the reactor encountered during the test and (2) to obtain information as to the kind and amount of contaminants removed by the acid solution.

30987 (HW–39751-Del.) **Hanford Atomic Products Operation monthly report, October 1955.** General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation. 30 Nov 1955. 400p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019307. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This document presents a summary of work and progress at the Hanford Engineer works for October, 1955. The report is divided into sections by department. A plant wide general summary is included at the beginning of the report, after which the departmental summaries begin. The Manufacturing Department reports plant statistics, and summaries for the Metal Preparation, Reactor and Separation sections. The Engineering Department's section summarizes work for the Technical, Design, and Project Sections. Costs for the various departments are presented in the Financial Department's summary. The Medical, Radiological Sciences, Utilities and General Services, Employee and Public Relations, and community Real Estate and Services departments have sections presenting their monthly statistics, work, progress, and summaries.

30988 (HW–66648) **Fuels Preparation Department monthly report, August 1960.** General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation. 8 Sep 1960. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019142. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This report discusses activities from the fuels processing department. Activities described include personnel statistics concerning injuries and accidents; operating plans concerning the N loading activities, 305 test reactor, projection fuel elements; process fuel element testing, and general engineering operations from the department.

30989 (HW–69583) **Test results for Supplement A to Production Test IP 358 AC.** Smith, M.L. General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation. 19 May 1961. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019146. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The primary test objective was to determine if the radioactivity induced in the reactor gas can be used as a means of monitoring the air in-leakage into the reactor. The second objective of the test was to calibrate the iodine monitor installed in conjunction with the 791 project. The report on the test results for the primary objective will be reported in this document. The primary objective of this supplement was to determine if the radiation detection system on the inlet gas line could be calibrated in terms of air in-leakage into the reactor. The source of radiation emanating from the inlet gas line is primarily from argon-41 which emits a 1.29 Mev gamma. Other emitters in the gas are N^{16} and O^{19} which have short half lives and do not effect the inlet gas activity.

30990 (HW–78039) **Chemical decontamination of Hanford production reactors.** Hauff, T.W.; Jensen, H.F.; Smith, R.H. General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation. 27 Jun 1963. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92018846. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The conduct of outage work in the discharge areas of the Hanford production reactors has always been complicated by personnel exposure to radiation from the contaminants which accumulate in the effluent water piping in the course of normal operations. These containments represent trace impurities in the cooling water, together with corrosion products, which are irradiated in passing through the reactor and then deposit in the unshielded rear face piping. Radioactive residues also accumulate on the external surfaces of this same complex and congested hardware. The radiation from these depositions increased as power levels and effluent water temperatures were raised, and by 1956 it was apparent that corrective steps would be essential to effective future maintenance work in the discharge areas. It is the purpose of this report to summarize the subsequent development and application of the chemical process for rear face piping decontamination which is being used so effectively in connection with the tube replacement program and other major outrage work.

30991 (JAERI-M–92-046) **An examination on the determination precision of uranium content in the HTGR fuel compacts.** Kobayashi, Fumiaki (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Ito, Mitsuo; Fukuda, Kousaku; Suzuki, Shuichi; Hoshino, Akira. Japan Atomic Energy Research Inst., Tokyo (Japan). Apr 1992. 23p. (In Japanese). Order Number DE93703535. Source: OSTI; NTIS; INIS.

Uranium content in the HTGR fuel compacts was measured by the oxidization method at three laboratories and difference of the results were examined. Also, two methods were applied for investigation of precision on the uranium determination. One is the oxidization method as a destructive inspection, and the other is the γ-ray method as a nondestructive inspection. It was found that the difference in results obtained at the three laboratories were less than 1 %. The difference in the results for the oxidization and the γ-ray methods was less than 0.6 %. Finally, the ratio of the specification of the uranium content in the manufactured fuel compacts to the measured content were found to be 0.99 for 44 fuel compacts tested. (author).

30992 (JAERI-M–92-049) **Annual progress report on the NSRR experiments, 20: January 1988 through March 1989.** Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 151p. (In Japanese). Order Number DE93703542. Source: OSTI; NTIS; INIS.

Fuel behavior studies in simulated reactivity initiated accident (RIA) conditions have been performed by utilizing Nuclear Safety Research Reactor (NSRR) since October 1975. This report describes the results obtained from experiments performed from January 1988 through March 1989. Those include 12 fuel parameter tests, 5 cooling condition parameter tests, 7 high energy deposition tests, 4 special measurement tests, 5 fuel damage tests, and 2 pre-irradiated fuel preparation tests. The status of code development and application is also reported. (author) 200 refs.

30993 (NUREG/CR–5646) **Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility).** Steele, R. Jr. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Nitzel, M.E. Nuclear Regulatory Commission, Washington, DC (United States). Div. of

Engineering; EG and G Idaho, Inc., Idaho Falls, ID (United States). Jul 1992. 218p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (EGG–2655). Source: OSTI; NTIS; INIS; GPO.

The SHAM seismic research program studied the effects of increasing levels of seismic excitation on a full-scale, in situ nuclear piping system containing a naturally aged United States (US) 8-in. motor-operated gate valve. The program was conducted by Kernforschungszentrum Karlsruhe at the Heissdampfreaktor near Frankfurt, Germany. Participants included the United States, Germany, and England. Fifty-one experiments were conducted, with the piping supported by six different piping support systems, including a typical stiff US piping support system of snubbers and rigid struts. This report specifically addresses the tests conducted with the US system. The piping system withstood large displacements caused by overload snubber failures and local piping strains. Although some limit switch chatter was observed, the motor operator and valve functioned smoothly throughout the tests. The results indicate that sufficient safety margins exist when commonly accepted design methods are applied and that piping systems will likely maintain their pressure boundary in the presence of severe loading and the loss of multiple supports.

30994 (ORNL/M–1607) **Analyses of the reflector tank, cold source, and beam tube cooling for ANS reactor.** Marland, S. (Tennessee Univ., Knoxville, TN (United States)). Oak Ridge National Lab., TN (United States). Jul 1992. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019392. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes my work as an intern with Martin Marietta Energy Systems, Inc., in the summer of 1991. I was assigned to the Reactor Technology Engineering Department, working on the Advanced Neutron Source (ANS). My first project was to select and analyze sealing systems for the top of the diverter/reflector tank. This involved investigating various metal seals and calculating the forces necessary to maintain an adequate seal. The force calculations led to an analysis of several bolt patterns and lockring concepts that could be used to maintain a seal on the vessel. Another project involved some pressure vessel stress calculations and the calculation of the center of gravity for the cold source assembly. I also completed some sketches of possible cooling channel patterns for the inner vessel of the cold source. In addition, I worked on some thermal design analyses for the reflector tank and beam tubes, including heat transfer calculations and assisting in Patran and Pthermal analyses. To supplement the ANS work, I worked on other projects. I completed some stress/deflection analyses on several different beams. These analyses were done with the aid of CAASE, a beam-analysis software package. An additional project involved bending analysis on a carbon removal system. This study was done to find the deflection of a complex-shaped beam when loaded with a full waste can.

30995 (PSI–123) **Irradiation techniques employed at the 10 MW_{th} SAPHIR reactor.** Chawla, R. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)); Christen, R.; Hammer, J.; Lehmann, E. Paul Scherrer Inst. (PSI), Villigen (Switzerland). Jun 1992. 19p. Order Number DE93602147. Source: OSTI; NTIS; INIS.

Paper presented at the international conference on irradiation technology, Saclay (France), 20-22 May 1992.

The 10 MW_{th} open-pool research reactor, SAPHIR, meets the requirements for a range of neutron irradiation applications. These include radioisotope production for research, medicine and industry, radiation damage studies for fission and fusion reactor materials, radiochemistry and neutron activation analysis, industrial irradiations such as silicon transmutation doping and neutron radiography and - last but not least - neutron scattering research using the various beam tube facilities. The current paper describes the corresponding irradiation techniques developed and being applied at the reactor. (author) 11 figs., 1 tab., 13 refs.

30996 (WSRC-TR–90-471) **Intergranular stress corrosion cracking: A rationalization of apparent differences among stress corrosion cracking tendencies for sensitized regions in the process water piping and in the tanks of SRS reactors.** Louthan, M.R. Westinghouse Savannah River Co., Aiken, SC (United States). 28 Sep 1990. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019924. Source: OSTI; NTIS; INIS; GPO Dep.

The frequency of stress corrosion cracking in the near weld regions of the SRS reactor tank walls is apparently lower than the cracking frequency near the pipe-to-pipe welds in the primary cooling water system. The difference in cracking tendency can be attributed to differences in the welding processes, fabrication schedules, near weld residual stresses, exposure conditions and other system variables. This memorandum discusses the technical issues that may account the differences in cracking tendencies based on a review of the fabrication and operating histories of the reactor systems and the accepted understanding of factors that control stress corrosion cracking in austenitic stainless steels.

2209 Reactor Safety

Refer also to citation(s) 30711, 30775, 30877, 30897, 30899, 30900, 30901, 30903, 30921, 30947, 30950, 30956, 30962, 30963, 31062, 32535, 32544, 32546, 32547

30997 (ANL/CP–75321) **Molten aluminum alloy fuel fragmentation experiments.** Gabor, J.D.; Purviance, R.T.; Cassulo, J.C.; Spencer, B.W. Argonne National Lab., IL (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920903–15: International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants, Salt Lake City, UT (United States), 20-24 Sep 1992). Order Number DE92019591. Source: OSTI; NTIS; INIS; GPO Dep.

Experiments were conducted in which molten aluminum alloys were injected into a 1.2 m deep pool of water. The parameters varied were (i) injectant material (8001 aluminum alloy and 12.3 wt% U-87.7 wt% Al), (ii) melt superheat (O to 50 K), (iii) water temperature (313, 343 and 373 K) and (iv) size and geometry of the pour stream (5, 10 and 20 mm diameter circular and 57 mm annular). The pour stream fragmentation was dominated by surface tension with large particles (~30 mm) being formed from varicose wave breakup of the 10-mm circular pours and from the annular flow off a 57 mm diameter tube. The fragments produced by the 5 mm circular et were smaller (~ mm), and the 20 mm jet which underwent sinuous wave breakup produced ~100 mm fragments. The fragments froze to form solid particles in 313 K water, and when the water was $\geq$343 K, the melt fragments did not freeze during their transit through 1.2 m of water.

30998 (BNL–47769) **Asymmetric flow events in a VEER 1000.** Horak, W.C.; Kennett, R.J.; Shier, W.; Guppy, J.G. Brookhaven National Lab., Upton, NY (United States). Jul 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-921110–18: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019254. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes the simulation of asymmetric loss of flow events in Russian designed VVER-1000 reactors using the RETRAN-02 Mod4 computer code. VVER-1000 reactors have significant differences from United States pressurized water reactors including multi-level emergency response systems and plant operation at reduced power levels with one or more main circulation pumps inoperable. The results of these simulations are compared to similar analyses done by the designers for the Rovno plant.

30999 (BNL–47786) **Single failure effects on surge line break transients for the VVER-440 reactor.** Shier, W.; Horak, W.; Kennett, R.; Yanev, Y. Brookhaven National Lab., Upton, NY (United States). [1992]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-921110–19: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019238. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes the analysis of surge line break transients for the soviet designed, water cooled, light water moderated, power reactors referred to as VVERS. These events represent an intermediate size loss of coolant accident (LOCA) for these plants and provide a severe challenge to the safety system design. The pressurizer surge line represents the largest diameter connection to the primary system and the break results in a relatively rapid blowdown of the primary system when compared to more conventional small break LOCAs (e,g., stuck open pressurizer relief valves). The VVER unit selected for this analysis is designated as VVER-440 Model V213. This plant generates 440 Mwe and is of current interest since fifteen are now operating and additional units are in various stages of construction. In addition to a base case surge line break analysis, this paper also presents the results of several sensitivity studies related to single failures in various plant safety systems that have been included in the design to mitigate the effects of such a LOCA on the plant and fuel system performance. Examples of the safety systems selected for these sensitivity studies include the scram system, the accumulators, and the high pressure injection system.

31000 (BNL-NUREG--47342) **Organizational culture during the accident response process.** Shurberg, D.A.; Haber, S.B. Brookhaven National Lab., Upton, NY (United States). [1992]. 5p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920606--37: American Nuclear Society annual meeting, Boston, MA (United States), 7-12 Jun 1992). Order Number DE92018164. Source: OSTI; NTIS; INIS; GPO Dep.

The ability of an organization to effectively move from an anticipatory to an ad hoc strategy may well depend on the organization having the ability to balance these two apparently dichotomous cultural styles. The organization which is most capable of making the necessary transition in an optimal manner may well exhibit some aspects of both cultural styles during normal operations. Data collected at one NPP does exhibit this pattern of results, with the organization exhibiting a clear hierarchical chain of command and perceived conventional behavioral expectations as well as exhibiting a more decentralized and collegial approach to decisionmaking, a team work orientation, and informal communications. Thus, it is expected that this organization possesses the capabilities to make a successful transition from an anticipatory to an ad hoc strategy. Data collected at a second NPP more strongly exhibits the traditional style suggested as being important during the anticipatory strategy, with more formal communications and bureaucratically controlled decision-making. This organization may experience difficulty if faced with the need to make a transition from an anticipatory to an ad hoc strategy. These conclusions are further validated based on observation of Emergency Preparedness Exercise Inspections, which suggest that the more anticipatory types of behaviors actually inhibit successful performance during an ad hoc response. The final validation of these hypotheses needs to be demonstrated with cultural data collected during emergency simulations. The mechanism to obtain such data during these types of situations is an area for future research.

31001 (BNL-NUREG--47766) **Outage management: A case study.** Haber, S.B. (Brookhaven National Lab., Upton, NY (United States)); Barriere, M.T.; Roberts, K.H. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9206106--3: 5. conference on human factors and power plants: power generation - the next decade and beyond, Monterey, CA (United States), 7-11 Jun 1992). Order Number DE92019234. Source: OSTI; NTIS; INIS; GPO Dep.

Outage management issues identified from a field study conducted at a two-unit commercial pressurized water reactor (PWR), when one unit was in a refueling outage and the other unit was at full power operation, are the focus of this paper. The study was conduced as part of the US Nuclear Regulatory Commission's (NRC) organizational factors research program, and therefore the issues to be addressed are from an organizational perspective. Topics discussed refer to areas identified by the NRC as critical for safety during shutdown operations, including outage planning and control, personnel stress, and improvements in training and procedures. Specifically, issues in communication, management attention, involvement and oversight, administrative processes, organizational culture, and human resources relevant to each of the areas are highlighted by example from field data collection. Insights regarding future guidance in these areas are presented based upon additional data collection subsequent to the original study.

31002 (BNL-NUREG--47768) **Safety aspects of forced flow cooldown transients in modular high temperature gas-cooled reactors.** Kroeger, P.G. Brookhaven National Lab., Upton, NY (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9209172--1: 5. nuclear reactor thermal-hydraulics (NURETH) conference, Salt Lake City, UT (United States), 21-24 Sep 1992). Order Number DE92019250. Source: OSTI; NTIS; INIS; GPO Dep.

During some of the design basis accidents in Modular High Temperature Gas Cooled Reactors (MHTGRs) the main Heat Transport System (HTS) and the Shutdown Cooling System (SCS), are assumed to have failed. Decay heat is then removed by the passive Reactor Cavity Cooling System (RCCS) only. If either forced flow cooling system becomes available during such a transient, its restart could significantly reduce the down-time. This paper uses the THATCH code to examine whether such restart, during a period of elevated core temperatures, can be accomplished within safe limits for fuel and metal component temperatures. If the reactor is scrammed, either system can apparently be restarted at any time, without exceeding any safe limits. However, under unscrammed conditions a restart of forced cooling can lead to recriticality, with fuel and metal temperatures significantly exceeding the safety limits.

31003 (BNL-NUREG--47809) **Analysis of PIUS reactor passive shutdown using PC-based model.** Cheng, H.S.; Van Tuyle, G.J. Brookhaven National Lab., Upton, NY (United States). [1992]. 16p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-921003--2: International conference on design and safety of advanced nuclear power plants, Tokyo (Japan), 25-28 Oct 1992). Order Number DE92019258. Source: OSTI; NTIS; INIS; GPO Dep.

A simplified model of the PIUS 600 Reactor System is described and results form two event simulations are discussed, and compared with ABB's predicted results. The model is based on a BWR Plant Analyzer developed by BNL, with PIUS-specific models added for the density locks. Initial results support the effectiveness of the passive reactor shutdown, although some significant power oscillations occur before the shutdown is completed.

31004 (BNL-NUREG--47818) **Assessment of prism responses to loss of flow events.** Slovik, G.C. (Brookhaven National Lab., Upton, NY (United States)); Van Tuyle, G.J.; Sands, S. Brookhaven National Lab., Upton, NY (United States). [1992]. 10p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-921003--1: International conference on design and safety of advanced nuclear power plants, Tokyo (Japan), 25-28 Oct 1992). Order Number DE92019218. Source: OSTI; NTIS; INIS; GPO Dep.

The Nuclear Regulatory Commission (NRC), with Brookhaven national Laboratory providing technical support, is continuing a preapplication review of the 471 MWt, advanced liquid metal reactor (ALMR), PRISM by General Electric. The revised design has been evaluated using the SSC code, for a series of loss of flow events (LOF) with and without gas expansion modules (GEMs). These devices have a net worth of 69¢ and have reduced the seriousness of the LOF in PRISM. However, it was found that the extremely low probability case of an instantaneous loss of 4 EM pumps without scram could lead to sodium boiling even with the GEMs.

31005 (DOE/ER/12900--3) **Characterization of jet breakup mechanisms observed from simulant experiments of molten fuel penetrating coolant: Technical progress report, FY 1992.** Jones, B.G. Illinois Univ., Urbana, IL (United States). Dept. of Nuclear Engineering. [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-89ER12900. Order Number DE92018548. Source: OSTI; NTIS; GPO Dep.

The goal of this research program has been to add to our understanding of the breakup of molten fuel jets penetrating reactor coolant. Easily handled working fluids are used to simulate fuel jet breakup, so that detailed observations may be obtained from a relatively large number of experiments. The tools used for observing this behavior are high speed notion picture photography, Flash X-radiography, and X-ray cine. Jet breakup lengths are determined from motion pictures; the mechanisms by which the jets are fragmented may be inferred from radiographs.

31006 (DPST–72-400) **Heat flux limits for control and safety rods.** Olson, H.P. Savannah River Lab., Aiken, SC (United States). Technical Div. 1 Dec 1972. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001 ;AC09-89SR18035. Order Number DE92019633. Source: OSTI; NTIS (US Sales Only); GPO Dep.

A proposed new Technical Standard (DPSTS-105-2.09, Safety Rod and Control Rod Heat Generation) specifies that the calculated operating heat flux for safety rods and control rods, that are assumed to be in the reactor during operation, shall be no greater than two-thirds the calculated minimum heat flux for film boiling burnout. Specifically, the operating heat flux shall not exceed 143,000 pcu/hr-ft^2 - safety rods; 293,000 pcu/hr-ft^2 - forced convection cooled control rods. This memorandum shows that this requirement is met for reactor charges typical of those currently operating or being developed, and shows a method for calculating the operating heat flux.

31007 (DUN–7038-RD) **Reactor Operations daily reports, July 1, 1970–June 30, 1971.** Thress, M.A. Douglas United Nuclear, Inc., Richland, WA (United States). 1 Jul 1970. 214p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019149. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This compilation of daily reports covers approximately one year of operation of the N and KE reactors at Hanford. Power generation, reactor status (shutdown, in operation, being started up, being shut down), maintenance activities, leak testing, water temperature, water flow rates and electricity demand are described. (GHH)

31008 (EGG-M–91413) **A model for calculation of RCS pressure during reflux boiling under reduced inventory conditions and its assessment against PKL data.** Palmrose, D.E. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Mandl, R.M. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1991]. 23p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-911079–32: 19. Nuclear Regulatory Commission (NRC) water reactor safety information meeting, Bethesda, MD (United States), 28-30 Oct 1991). Order Number DE92017898. Source: OSTI; NTIS; INIS; GPO Dep.

There has been recent interest in the United States concerning the loss of residual heat removal system (RHRS) under reduced coolant inventory conditions for pressurized water reactors. This issue is also of interest in the Federal Republic of Germany and an experiment was performed in the integral PKL-HI experimental facility at Siemens-KWU to supply applicable data. Recently, an NRC-sponsored effort has been undertaken at the Idaho-National Engineering Laboratory to identify and analyze the important thermal-hydraulic phenomena in pressurized water reactors following the long term loss-of-RHRS during reduced inventory operation. The thermal-hydraulic response of a closed reactor coolant system during such a transient is investigated in this report. Some of the specific processes investigated include: reflux condensation in the steam generators, the corresponding pressure increase in the reactor coolant system, and void fraction distributions on the primary side of the system. Mathematical models of these and other physical processes Experiment B4.5.

31009 (EGG-M–91432) **Most likely failure location during severe accident conditions.** Rempe, J.L.; Allison, C.M. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1991]. 20p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-911079–33: 19. Nuclear Regulatory Commission (NRC) water reactor safety information meeting, Bethesda, MD (United States), 28-30 Oct 1991). Order Number DE92017940. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes preliminary results from which finite element calculation results are used in conjunction with analytical calculation results to predict failure in different LWR vessel designs during a severe accident. Detailed analyses are being performed to investigate the relative likelihood of a BWR vessel and drain line penetration to fail during a wide range of severe accident conditions. Analytically developed failure maps, which were developed in terms of dimensionless groups, are applied to consider geometries and materials occurring in other LWR vessel designs. Preliminary numerical analysis results indicate that if ceramic debris relocates within the BWR drain line to a distance below the lower head, the drain line will reach failure temperatures before the vessel fails. Application of failure maps for these debris conditions to other LWR geometries indicate that in-vessel tube melting will occur in either BWR or PWR vessel designs. Furthermore, if this melt is assumed to fill the entire penetration flow area, the melt is predicted to travel well below the lower head in any of the reference LWR penetrations. However, failure maps suggest the result that ex-vessel tube temperatures exceed the penetration's ultimate strength is specific to the BWR drain line because of its material composition and relatively large effective diameter for melt flow.

31010 (EGG-MS–10247) **Methodology to identify risk-significant components for inservice inspection and testing.** Anderson, M.T.; Hartley, R.S.; Jones, J.L. Jr.; Kido, C.; Phillips, J.H. EG and G Idaho, Inc., Idaho Falls, ID (United States). Aug 1992. 161p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019685. Source: OSTI; NTIS; INIS; GPO Dep.

Periodic inspection and testing of vital system components should be performed to ensure the safe and reliable operation of Department of Energy (DOE) nuclear processing facilities. Probabilistic techniques may be used to help identify and rank components by their relative risk. A risk-based ranking would allow varied DOE sites to implement inspection and testing programs in an effective and cost-efficient manner. This report describes a methodology that can be used to rank components, while addressing multiple risk issues.

31011 (EGG-NE–10289) **Countercurrent flow-limiting characteristics of a Savannah River Plant control rod septifoil.** Anderson, J.L. EG and G Idaho, Inc., Idaho Falls, ID (United States). Jul 1992. 71p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019686. Source: OSTI; NTIS; INIS; GPO Dep.

Experiments were performed at the Idaho National Engineering Laboratory to investigate the counter-current flow limiting characteristics of a Savannah River Plant control rod septifoil assembly. These experiments were unheated, using air and water as the working fluids. Results are presented in terms of the Wallis flooding correlation for several different control rod configurations. Flooding was observed to occur in the vicinity of the inlet slots/holes of the septifoil, rather than within the rod bundle at the location of the minimum flow area. Nearly identical flooding characteristics of the septifoil were observed for configurations with zero, three, and four rods inserted, but significantly different results occurred with 5 rods inserted.

31012 (JAERI-M–92-012, pp. 11-22) **Overview of severe accident research in Japan.** Kondo, S. (Tokyo Univ. (Japan). Faculty of Engineering). Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

An overview of Japanese activities of LWR severe accident research is presented, covering various fields and topics of experimental and analytical study on severe accident phenomena. Also reviewed are some procedural measures under consideration for managing severe accident at LWR plant based on the knowledge and methodology developed in this activities. (author).

31013 (JAERI-M–92-012, pp. 23-34) **Overview of the ACF Iodine project.** Ritzman, R.L. (Electric Power Research Inst., Palo Alto, CA (United States)). Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991).

In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The ACE iodine project is a multi-component research program with international sponsorship that was designed to generate data on several issues which were viewed as being important to the analysis of iodine behavior in containment during severe accidents. The principal phenomena investigated include radiolysis, hydrogen combustion, aerosol interactions, and surface coating (paint) interactions in a combination of laboratory experiments, intermediate scale tests, a large-scale containment vessel experiment, and supporting studies. The experimental design of the separate components of the program are summarized and the key results obtained in these studies are described. The significance of this body of new information to the problem of predicting iodine behavior in containment during severe accidents is also discussed. (author).

31014 (JAERI-M--92-012, pp. 49-61) **The Canadian programme on iodine chemistry in reactor safety.** Fluke, R.J. (Ontario Hydro, Toronto, ON (Canada)); Frescura, G.M.; Sagert, N.H.; Tennankore, K.N.; Vikis, A.C. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The Canadian program on iodine chemistry in reactor safety provides information needed to quantify and minimize iodine release to the environment following a postulated reactor accident. This comprehensive program consists of fundamental studies, bench-scale 'separate-effects' experiments, and intermediate-scale 'all-effects' integrated tests, to address the chemistry of iodine in the containment system, in-core studies, to address the high-temperature chemistry of fission products in UO_2 fuel, and iodine abatement studies. Large-scale test data are obtained by participation in international projects such as ACE and PHEBUS-FP. The main focus of the program is the development and validation of the LIRIC model and database, used to predict iodine behaviour in various postulated accidents. The rationale for the program, its main elements, and recent progress are reviewed in this document. (author).

31015 (JAERI-M--92-012, pp. 264-279) **The ace large scale iodine experiment at the Containment Systems Test Facility (CSTF).** Ritzman, R.L. (Electric Power Research Inst., Palo Alto, CA (United States)); McCormack, J.D.; Dickinson, D.R.; Allemann, R.T. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373--: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The behavior of iodine was studied under conditions simulating its release into a nuclear reactor containment vessel during a possible severe accident. The vessel atmosphere included gram/m^3 range concentrations of mixed CsOH/MnO aerosols. Measurements showed that HI, I_2 and Cs were removed from the gas phase at similar rates, primarily by gravitational settling, indicating that the iodine vapor species had become associated with aerosol particles. About 0.2 % of the total iodine was converted to organic species in the test. (author).

31016 (NUREG--1442-Rev.1) **Emergency Response Resources guide for nuclear power plant emergencies: Revision 1.** Nuclear Regulatory Commission, Washington, DC (United States); Federal Emergency Management Agency, Washington, DC (United States). Jul 1992. 36p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). (FEMA-REP--17-Rev.1). Source: OSTI; NTIS; INIS; GPO.

On August 28 and September 18, 1990, the States of Louisiana and Mississippi, Gulf States Utilities, five local parishes, six Federal agencies, and the American Nuclear Insurers participated in a post-emergency TABLETOP exercise in Baton Rouge, Louisiana. One of the products developed from that experience was this guide for understanding the responsibilities and obtaining resources for specific needs from the various participants, particularly from those organizations within the Federal Government. This first revision of that guide broadens the focus of the original document. Also, new information defines the major Federal response facilities. This guide should assist State and local government organizations with identifying and obtaining those resources for the post-emergency response when their resources have been exhausted.

31017 (NUREG--1457) **Resources available for nuclear power plant emergencies under the Price-Anderson Act and the Robert T. Stafford Disaster Relief and Emergency Assistance Act.** Nuclear Regulatory Commission, Washington, DC (United States). Div. of Operational Assessment. Jul 1992. 15p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; INIS; GPO.

Through a series of TABLETOP exercises and other events that involved participation by State and Federal organizations, the need was identified for further explanation of financial and other related resources available to individuals and State and local governments in a major emergency at a nuclear power plant. A group with representatives from the Nuclear Regulatory commission, the Federal Emergency Management Agency, and the American Nuclear Insurers/Mutual Atomic Energy Liability Underwriters was established to work toward this end. This report is the result of that effort. This document is not meant to modify, undermine, or replace any other planning document (e.g., the Federal Radiological Emergency Response Plan or the Federal Response Plan). Its purpose is to clarify issues that have surfaced regarding resources available under the Price-Anderson and Stafford Acts.

31018 (NUREG/CP--0120) **Proceedings of the fifth workshop on containment integrity.** Parks, M.B. (Sandia National Labs., Albuquerque, NM (United States)); Hughey, C.E. (eds.). Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 646p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-76DP00789. (SAND--92-0173;CONF-920541--: 5. workshop on containment integrity for nuclear power plants, Washington, DC (United States), 12-14 May 1992). Source: OSTI; NTIS; INIS; GPO.

The Fifth Workshop on Containment Integrity was held in Washington, DC, on May 12--14, 1992. The purpose of these workshops is to provide an international forum for the exchange of information on performance of containments in nuclear power plants under severe accident loadings. Severe accident investigations of existing containment designs as well as future advanced containments were presented during the workshop. There were 145 participants at the workshop from 15 countries. Individual papers have been cataloged separately.

31019 (NUREG/CP--0124) **Workshop on the use of PRA methodology for the analysis of reactor events and operational data: Proceedings.** Rasmuson, D.M. (Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Programs); Dingman, S. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Programs. Jun 1992. 132p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). (CONF-9201110--Summ.: Workshop on the use of PRA methodology for the analysis of reactor events and operational data, Annapolis, MD (United States), 29-30 Jan 1992). Source: OSTI; NTIS; INIS; GPO.

A workshop entitled "The Use of PRA Methodology for the Analysis of Reactor Events and Operational Data" was held on January 29--30, 1992 in Annapolis, Maryland. Over 50 participants from the NRC, its contractors, and others participated in the meetings. During the first day, presentations were made by invited speakers to discuss issues in relevant topics. On the second day, discussion groups were held to focus on three areas: risk significance of operational events, industry risk profile and generic concerns, and risk monitoring and risk-based performance indicators. Important considerations identified from the workshop are the following: Improve the Accident Sequence Precursor models and data. Improve the SCSS and NPRDS (e.g., by adding detailed performance information on selected components, by improving narratives on failure causes). Develop risk-based performance indicators. Use risk insights to help focus trending and performance analyses of components, systems, initiators, and sequences. Improve the statistical quality of trending and performance analyses. Flag implications of special conditions (e.g., external events, containment performance) during data studies. Trend common cause and human performance using appropriate models to obtain a better understanding of the impact and causes of failure. Develop a method for producing an industry risk profile.

31020 (NUREG/CR–3320-Vol.2) **LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2.** McElroy, W.N. (ed.) (Consultants & Technology Services, Richland, WA (United States)); Gold, R. (ed.); McGarry, E.D. (ed.). Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 147p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC06-76RL01830. (WHC-EP–0204-Vol.2). Source: OSTI; NTIS; INIS; GPO.

The metallurgical irradiation experiment at the Oak Ridge Research Reactor Poolside Facility (ORR-PSF) is one of the series of benchmark experiments in the framework of the Light Water Reactor Pressure Vessel Surveillance Dosimetry Improvement Program (LWR-PV-SDIP). The goal of this program is to test, against well-established benchmarks, the methodologies and data bases that are used to predict the irradiation embrittlement and fracture toughness of pressure and support structure steels. The prediction methodology includes procedures for neutron physics calculations, dosimetry and spectrum adjustment methods, metallurgical tests, and damage correlations. The benchmark experiments serve to validate, improve, and standardize these procedures. The results of this program are implemented in a set of ASTM standards on pressure vessel surveillance procedures. These, in turn, may be used as guides for the nuclear industry for the USNRC. To serve as a benchmark, a very careful characterization of the ORR-PSF experiment is necessary, both in terms of neutron flux-fluence spectra and of metallurgical test results. Statistically determined uncertainties must be given in terms of variances and covariancies to make comparisons between predictions and experimental results meaningful. This report supports analysis of the PSF Blind Test and provides experimental conditions, as-built documentation, and PSF physics-dosimetry results for the Startup, SSC-1, and SSC-2 experiments.

31021 (NUREG/CR–4391) **TRAC-BF1/MOD1 models and correlations.** Borkowski, J.A. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Wade, N.L. (eds.); Rouhani, S.Z.; Shumway, R.W.; Weaver, W.L.; Rettig, W.H.; Kullberg, C.L. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Systems Research; EG and G Idaho, Inc., Idaho Falls, ID (United States). Aug 1992. 449p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (EGG–2680). Source: OSTI; NTIS; INIS; GPO.

The TRAC-BWR code development program at the Idaho National Engineering Laboratory has developed versions of the Transient Reactor Analysis Code (TRAC) for the US Nuclear Regulatory Commission and the public. The TRAC-BF1/MOD1 version of the computer code provides a best-estimate analysis capability for analyzing the full range of postulated accidents in boiling water reactor (BWR) systems and related facilities. This version provides a consistent and unified analysis capability for analyzing all areas of a large- or small-break loss-of-coolant accident (LOCA), beginning with the blowdown phase and continuing through heatup, reflood with quenching, and, finally, the refill phase of the accident. Also provided is a basic capability for the analysis of operational transients up to and including anticipated transients without scram (ATWS). The TRAC- BF1/MOD1 version produces results consistent with previous versions. Assessment calculations using the two TRAC-BF1 versions show overall improvements in agreement with data and computation times as compared to earlier versions of the TRAC-BWR series of computer codes.

31022 (NUREG/CR–4469-Vol.14) **Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991.** Doctor, S.R. (Pacific Northwest Lab., Richland, WA (United States)); Diaz, A.A.; Friley, J.R.; Good, M.S.; Greenwood, M.S.; Heasler, P.G.; Hockey, R.L.; Kurtz, R.J.; Simonen, F.A.; Spanner, J.C.; Taylor, T.T.; Vo, T.V. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 78p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC06-76RL01830. (PNL–5711-Vol.14). Source: OSTI; NTIS; INIS.

The Evaluation and Improvement of NDE Reliability for Inservice Inspection of Light Water Reactors (NDE Reliability) Program at the Pacific Northwest Laboratory was established by the Nuclear Regulatory Commission to determine the reliability of current inservice inspection (ISI) techniques and to develop recommendations that will ensure a suitably high inspection reliability. The objectives of this program include determining the reliability of ISI performed on the primary systems of commercial light-water reactors (LWR's); using probabilistic fracture mechanics analysis to determine the impact of NDE unreliability on system safety; and evaluating reliability improvements that can be achieved with improved and advanced technology. A final objective is to formulate recommended revisions to the Regulatory and ASME Code requirements, based on material properties, service conditions, and NDE uncertainties. The program scope is limited to ISI of the primary systems including the piping, vessel, and other components inspected in accordance with Section XI of the ASME Code. This is a progress report covering the programmatic work from April 1991 through September 1991.

31023 (NUREG/CR–4832-Vol.3-Pt.2) **Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP): Volume 3, Part 2, Internal events accident sequence quantification: Appendices.** Payne, A.C. Jr. (Sandia National Labs., Albuquerque, NM (United States)); Daniel, S.L.; Whitehead, D.W.; Sype, T.T.; Dingman, S.E.; Shaffer, C.J. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Issue Resolution; Sandia National Labs., Albuquerque, NM (United States). Aug 1992. 741p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-76DP00789. (SAND–92-0537-Vol.3-Pt.2). Source: OSTI; NTIS; INIS; GPO.

This volume presents the methodology and results of the internal event accident sequence analysis of the LaSalle Unit II nuclear power plant performed as part of the Level III Probabilistic Risk Assessment being performed by Sandia National Laboratories for the Nuclear Regulatory commission. The total internal core damage frequency has a mean valve of 4.41E-05/R-yr. with a 5th percentile of 2.05E-6/R-yr., a median value of 1.64E-05/R-yr. , and a 95th percentile of 1.39E-04/R-yr. The dominant sequences involve a loss of off-site power (LOSP), immediate or delayed failure of on-site AC power resulting in station-blackout, and failure of the reactor core isolation cooling system (RCIC). The events most important to risk reduction are: frequency of LOSP, non-recovery of offsite power within one hour, diesel generator (DG) cooling water pump common mode failure, and non-recoverable isolation of RCIC during station blackouts. The events most important to risk increase are: failure of various AC power circuit breakers resulting in partial loss of onsite AC power, failure to scram, and DG cooling water common mode failure. The dominant contributors to uncertainty are: control circuit failure rates, relay coil failure to energize, energized relay coils failing deenergized, frequency of LOSP, and DG failure to start.

31024 (NUREG/CR–5378) **Aging data analysis and risk assessment: Development and demonstration study.** Wolford, A.J. (DNV Technica, Columbus, OH (United States)); Atwood, C.L.; Roesener, W.S. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; EG and G Idaho, Inc., Idaho Falls, ID (United States). Aug 1992. 246p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC07-76ID01570. (EGG–2567). Source: OSTI; NTIS; GPO.

This work develops and demonstrates a probabilistic risk assessment (PRA) approach to assess the effect of aging and degradation of active components on plant risk. The work (a) develops a way to identify and quantify age-dependent failure rates of active components, and to incorporate them into PRA; (b) demonstrates these tools by applying them to a fluid-mechanical system, using the key elements of a NUREG-1150 PRA; and (c) presents them in a step-by-step approach, to be used for evaluating risk significance of aging phenomena in systems of interest. Statistical tests are used for detecting increasing failure rates and for testing data-pooling assumptions and model adequacy. The component failure rates are assumed to change over time, with several forms used to model the age dependence–exponential, Weibull, and linear. Confidence intervals for the age-dependent failure rates are found and used to develop inputs to a PRA model in order to determine the plant core damage frequency. This approach was used with plant-specific data, obtained as maintenance work requests, for the auxiliary feedwater system of an older pressurized water reactor. It can be used for extrapolating present trends into the near future, and for supporting risk-based aging management decisions.

31025 (NUREG/CR–5700) **Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences.** Gehl, A.C. (Oak Ridge National Lab., TN (United States)); Hagen, E.W. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering; Oak Ridge National Lab., TN (United States). Jul 1992. 147p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/TM–11806). Source: OSTI; NTIS; INIS; GPO.

A study of the aging-related operating experiences throughout a five-year period (1984–1988) of six generic instrumentation modules (indicators, sensors, controllers, transmitters, annunciators, and recorders) was performed as a part of the Nuclear Plant Aging Research Program. The effects of aging from operational and environmental stressors were characterized from results depicted in Licensee Event Reports (LERs). The data are graphically displayed as frequency of events per plant year for operating plant ages from 1 to 28 years to determine aging-related failure trend patterns. Three main conclusions were drawn from this study: (1) Instrumentation and control (I&C) modules make a modest contribution to safety-significant events: 17% of LERs issued during 1984–1988 dealt with malfunctions of the six I&C modules studied, and 28% of the LERs dealing with these I&C module malfunctions were aging related (other studies show a range 25–50%); (2) Of the six modules studied, indicators, sensors, and controllers account for the bulk (83%) of aging-related failures; and (3) Infant mortality appears to be the dominant aging-related failure mode for most I&C module categories (with the exception of annunciators and recorders, which appear to fail randomly).

31026 (NUREG/IA–0067) **Recirculation suction large break LOCA analysis of the Santa Maria De Garona Nuclear Power Plant using TRAC-BF1 (G1J1).** Lopez, J.V. (Universidad Politecnica de Madrid (Spain)); Blanco, J.; Crespo, J.L.; Fernandez, R.A. Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research; Universidad Politecnica de Madrid (Spain). Aug 1992. 50p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; INIS; GPO.

This document presents a recirculation suction large break loss of coolant accident analysis of Santa Maria de Garona Nuclear Power Plant. The plant is a General Electric Boiling Water Reactor 3, containment type Mark 1. It is operated by NUCLENOR, S.A. and was connected to the grid in 1971. The analysis has been performed by the Chair of Nuclear Technology from the Polytechnical University of Madrid, the Applied Physics Department from the University of Cantabria and the Analysis and Operation Section from NUCLENOR, S.A. as a part of an agreement for developing an engineering simulator of operational transients and accidents for Santa Maria de Garona Power Plant. The analysis was performed using the frozen version of TRAC-BFI (GIJI) code and is the first of two NUCLENOR contributions to the International Code Applications and Assessment Program (ICAP).

31027 (ORNL/ER–130) **Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program FY 1993–2002.** Ford, M.K.; Holder, L. Jr. Oak Ridge National Lab., TN (United States). Jul 1992. 115p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019495. Source: OSTI; NTIS; INIS; GPO Dep.

The Decontamination and Decommissioning (D&D) Program at the Oak Ridge National Laboratory (ORNL) is part of the Department of Energy (DOE) Environmental Restoration D&D program. The purpose and objectivesof this program include: (1) surveillance and maintenance (S&M) of facilities awaiting decommissioning; (2) planning for the orderly decommissioning of these facilities; and (3) implementation of a program to accomplish facility disposition in a safe, cost-effective, and timely manner. Participating D&D contractors are required to prepare formal plans that document the S&M programs established for each site. This report has been prepared to provide this documentation for those facilities included in the ORNL D&D Program.

31028 (SAND–91-1222) **An analysis of radionuclide behavior in water pools during accidents at the Annular Core Research Reactor.** Powers, D.A. Sandia National Labs., Albuquerque, NM (United States). Aug 1992. 251p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019461. Source: OSTI; NTIS; INIS; GPO Dep.

Physical and chemical phenomena that will affect the behavior of radionuclides released from fuel in the Annular Core Research Reactor during a hypothetical, core disruptive accident are described. The phenomena include boiling of water on heated clad, metal-water reactions, vapor nucleation to form aerosol particles, coagulation of aerosol particles, aerosol deposition within bubbles rising through the shield pool, vapor dissolution in the shield pool, and revaporization of radionuclides from the shield pool. A model of these phenomena is developed and applied to predict the release of radionuclides to the confinement building of the Annular Core Research Reactor. It is found that the shield pool provides overall decontamination factors for particulate of about 2.8×10^5 and decontamination factors for noble gases of about 2.5–3.7. These results are found to be sensitive to the predicted clad temperature and bubble behavior in the shield pool. Slow revalorization of krypton, xenon and iodine from the shield pool is shown to create a prolonged, low-intensity source term of radioactive material to the confinement atmosphere.

31029 (SAND–91-2191C) **Interactions between drops of molten Al-Li alloys and liquid water.** Nelson, L.S.; Duda, P.M.; Hyndman, D.A. Sandia National Labs., Albuquerque, NM (United States). [1991]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921102–15: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92018266. Source: OSTI; NTIS; GPO Dep.

The goals of this program were to: (a) develop experimental procedures for preparing and delivering drops of molten Al-Li alloys into liquid water; (b) develop procedures and diagnostics for characterizing the interactions; (c) measure the hydrogen generated by the reaction between melt and water; (d) examine the debris recovered after the interaction; and (e) determine changes in the aqueous phase produced by the melt-water chemical reactions. As a major objective of this work, the experiments were performed without triggers applied to the water in order to investigate whether spontaneous initiation of steam explosions occurred with these alloys. The drop sizes and melt temperatures were chosen to simulate melt globules that might form during hypothesized melting of certain Al-Li alloy components of aluminum alloy-fueled nonpower reactors.

31030 (SAND–91-2322) **Gas blowthrough and flow quality correlations for use in the analysis of high pressure melt ejection (HPME) events.** Pilch, M.; Griffith, R.O. Sandia National Labs., Albuquerque, NM (United States). Jun 1992. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019323. Source: OSTI; NTIS; INIS; GPO Dep.

A number of correlations describing the advent of gas blowthrough and the subsequent exit quality were collected and examined. A simple scaling analysis was applied to these correlations to identify important nondimensional groups, and the range of values for these dimensionless groups at nuclear power plant (NPP) and experimental scales were used to examine the applicability of the correlations at different scales. The performance of each of the correlations was also assessed over a typical parameter range for NPP and experimental conditions. The Gluck correlations for the onset of gas blowthrough is recommended for high pressure melt ejection analyses. AL new model is developed for predicting the two-phase flow quality following the onset of gas blowthrough. Uncertainty estimates for the blowthrough correlation and the flow quality correlation are quantified.

31031 (SAND–91-2692) **Audit calculations with CORCON-MOD 3 of the duration of superheat in NUREG/CR-5423.** Powers, D.A.; Heames, T.J. Sandia National Labs., Albuquerque, NM (United States). May 1992. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019322. Source: OSTI; NTIS; INIS; GPO Dep.

Analyses have shown that early rupture of the Mark-I boiling water reactor containment-by the direct action of core debris depends strongly on the time that core debris is superheated above its liquidus. The analyses of the duration of superheat in the core debris are compared to predictions obtained with the CORCON-MOD 3 computer code. The predicitons of this computer code as functions of the core debris mass, composition, and initial superheat are used to create a polynomial response surface. This response surface is used in a Monte Carlo analysis to produce probability distributions for the duration of superheat in core debris in the drywell of a Mark-I containment. It is concluded that to a high level of confidence (>90%) the duration of superheating predicted with the CORCON-MOD 3 code is less than what has been used in the analyses of the threats to the Mark-I containment liner. Based on these results, to the extent superheat duration dictates the threat to the liner, analyses in NUREG/CR-5423 would appear to overestimate the threat to the liner in comparison to threats estimated using the predictions of the duration of superheating obtained with CORCON-MOD 3.

31032 (SAPE-CPI–8) **Nuclear safety. Beyond the technical details.** Andrews, H.R.; Harvey, M. Society of AECL Employees, Deep River, ON (Canada). Sep 1987 10p. Order Number DE92644588. Source: OSTI; NTIS (US Sales Only); INIS.

A brief presented to the Ontario Nuclear Safety review.

Nuclear safety standards must be set up with due regard for overall societal safety. Several factors contribute to the safety of the CANDU reactor, particularly open, honest and accountable review at every level. Improved public information and education in nuclear matters will contribute to the welfare of society.

31033 (WSRC-MS–92-046) **Particle blockage and flow degeneration in Savannah River Site reactor fuel/target assemblies.** Geiger, G.T. (Westinghouse Savannah River Co., Aiken, SC (United States)); Paik, I.K.; Patterson, D.C.; Smith, D.C.; Foti, D.J. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921110–5: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92015337. Source: OSTI; NTIS; GPO Dep.

In the event of a Savannah River Site K-Reactor Loss of Fuel Accident (LOFA), a postulated consequences of a single assembly melting is that the debris from this assembly results in flow blockage of another assembly sufficient to cause the second assembly to fail. Material from this second failed assembly may sufficiently block the flow to yet another assembly, resulting in a cascade of failures. This study addresses, analytically and experimentally, the likelihood that sufficient flow degradation occurs. An experiment was performed in which particles were injected into a stream leading to a prototypic assembly. The flow degradation was measured for different particle size distributions and particle quantities. The analytical portion examines the filtering of the particle debris through the process cooling water loop (some of the larger particles cannot pass through the heat exchangers) and the geometrical conditions necessary to block the holes to the assembly. Based on calculated particle concentrations and the blockage geometry, the probability for such blockage is estimated.

31034 (WSRC-MS–92-047) **Thermal hydraulic performance of naturally aspirated control rod housing assemblies.** Geiger, G.T. (Westinghouse Savannah River Co., Aiken, SC (United States)); Randolph, H.W.; Paik, I.K.; Foti, D.J. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921110–7: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92016711. Source: OSTI; NTIS; INIS; GPO Dep.

Savannah River Site reactors are comprised of heat generating fuel/target assemblies, control rods which regulate reactor power, and heavy water which acts as the coolant and as a moderator. The fuel/target assemblies are cooled by the downflow of heavy water while the control rods are cooled via upflow. Five control rods are grouped with two safety rods in seven-channel assemblies called septifoils. Under normal operating conditions, the reactor power level, radial shape flux and axial power flux are regulated by the positioning of the control rods. The control rods are solid rods of a lithium-aluminum alloy with an thin aluminum outer sheath. Lithium is a good absorber of neutrons and, thus control rod temperatures rise with reactor power. At conditions of sufficiently high reactor power and degraded coolant flow, the control rods could heat sufficiently to cause a metallurigical failure of the sheath leading to molten material coming in contact with water and the possibility of a steam explosion. An accident has been postulated as part of the analysis involving the safety upgrade of Savannah River Site reactors in which the housing is not seated on the pin. Coolant from the upflow pin would not be directed into the housing but, into the moderator space surrounding the housing. Only naturally aspirated cooling due to buoyancy effects would be available to cool the control rods and the coolant mass flow rate would drop significantly from its nominal value. In this study, the mechanisms and limits of cooling heated rods housed in an unseated septifoil are addressed. Experiments were conducted on a shortened, prototypic housing with electrically heated rods to gain an understanding of the phenomena governing the cooling in such a case and develop data which can be used to evaluate predictive models. These experiments are described, their results discussed, and the predictions of current models is presented.

31035 (WSRC-MS–92-112) **The possibility of steam explosions for a misseated septifoil in the SRS K Production reactor.** Allison, D.K. (Westinghouse Savannah River Co., Aiken, SC (United States)); Hyder, M.L.; Yau, W.W.F.; Smith, D.C. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921110–3: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92013079. Source: OSTI; NTIS; GPO Dep.

Control rods in the Savannah River Site's K-reactor are contained within housings composed of seven channels ('septifoils'). Each septifoil is suspended from the top of the reactor and is normally seated on an upflow pin that channels coolant to the septifoil. Forced flow to the septifoil would be eliminated in the unlikely event of a septifoil misseated upon installation, i.e., if the septifoil is not aligned with its upflow pin. If this event were not detected, control rod melting and the interaction of molten metal with water might occur. This paper describes a methodology used to address the issues of steam explosions that might arise by this mechanism. The probability of occurrence of a damaging steam explosion given a misseated septifoil was found to be extremely low. The primary reasons are: (1) the high probability that melting will not occur, (2) the possibility of material holdup by contact with the outer septifoil housing, (3) the relative shallowness of the pool of water into which molten material might fall, (4) the probable absence of a trigger, and (5) the relatively large energy release required to damage a nearby fuel assembly. The methodology is based upon the specification of conditions prevailing within the septifoil at the time molten material is expected to contact water, and upon information derived from the available experimental data base, supplemented by recent prototypic experiments.

31036 (WSRC-MS–92-181) **Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions.** Thomas, J.K. (Westinghouse Savannah River Co., Aiken, SC (United States)); Iyer, N.C.; Begley, J.A. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921102–4: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92015884. Source: OSTI; NTIS; INIS; GPO Dep.

The susceptibility of stainless steel 304 to liquid metal embrittlement (LME) by cadmium (Cd) and cadmium-aluminum (Cd-Al) solutions was examined as part of a failure evaluation for SS304-clad cadmium reactor safety rods which had been exposed to elevated temperatures. The active, or cadmium (Cd) bearing, portion of the safety rod consists of a 0.756 in. diameter aluminum allow (Al-6061) core, a 0.05 in. thick Cd layer, and a 0.042 in. thick Type 304 stainless steel cladding. The safety rod thermal tests were conducted as part of a program to define the response of reactor core components to a hypothetical LOCA for the Savannah River Site (SRS) production reactor. LME was considered as a potential failure mechanism based on the nature of the failure and susceptibility of austenitic stainless steels to embrittlement by other liquid metals.

31037 (WSRC-MS-92-231) **The steam explosion potential for an unseated SRS reactor septifoil.** Allison, D.K. (Westinghouse Savannah River Co., Aiken, SC (United States)); Hyder, M.L.; Yau, W.W.F.; Smith, D.C. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921110-22: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019678. Source: OSTI; NTIS; INIS; GPO Dep.

Control rods in the Savannah River Site's K Reactor are contained within housings composed of seven channels ("septifoils"). Each septifoil is suspended from the top of the reactor and is normally seated on an upflow pin that channels coolant to the septifoil. Forced flow to the septifoil would be eliminated in the unlikely event of a septifoil unseated upon installation, i.e., if the septifoil is not aligned with its upflow pin. If this event were not detected, control rod melting and the interaction of molten metal with water might occur. This paper describes a methodology used to address the issue of steam explosions that might arise by this mechanism. The probability of occurrence of a damaging steam explosion given an unseated septifoil was found to be extremely low. The primary reasons are: (1) the high probability that melting will not occur, (2) the possibility of material holdup by contact with the outer septifoil housing, (3) the relative shallowness of the pool 'Of water into which molten material might fall, (4) the probable absence of a trigger, and (5) the relatively large energy release required to damage a nearby fuel assembly. The methodology is based upon the specification of conditions prevailing within the septifoil at the time molten material is expected to contact water, and upon information derived from the available experimental data base, supplemented by recent prototypic experiments.

31038 (WSRC-RD-91-24) **Aluminum oxide film thickness and emittance.** Thomas, J.K.; Ondrejcin, R.S. Westinghouse Savannah River Co., Aiken, SC (United States). Nov 1991. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035 ;AC09-76SR00001. Order Number DE92019931. Source: OSTI; NTIS; INIS; GPO Dep.

Aluminum reactor components which are not actively cooled could be subjected to high temperatures due to gamma heating after the core coolant level dropped during the ECS phase of a hypothetical LOCA event. Radiative heat transfer is the dominant heat transfer process in this scenario and therefore the emittance of these components is of interest. Of particular interest are the safety rod thimbles and Mark 60B blanket assemblies; for the K Reactor, these components have been exposed to low temperature (< 55°C) moderator for about a year. The average moderator temperature was assumed to be 30°C. The Al oxide film thickness at this temperature, after one year of exposure, is predicted to be 6.4 μm ± 10%; insensitive to exposure time. Dehydration of the film during the gamma heating accident would result in a film thickness of 6.0 μm ± 11%. Total hemispherical emittance is predicted to be 0.69 at 96°C, decreasing to 0.45 at 600°C. Some phenomena which would tend to yield thicker oxide films in the reactor environment relative to those obtained under experimental conditions were neglected and the predicted film thickness values are therefore conservative. The emittance values predicted for a given film thickness are also conservative. The conservativisms inherent in the predicted emittance are particularly relevant for uncertainty analysis of temperatures generated using these values.

31039 (WSRC-TR-92-42-003) **Actuator system history of safety rod lower latch problems review of latch inspection video tapes.** Banks, J.J. Westinghouse Savannah River Co., Aiken, SC (United States). 24 Jun 1992. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019920. Source: OSTI; NTIS; GPO Dep.

During pre-restart testing the safety rod at position X26-YIO bound after being driven approximately two (2) feet out of the reactor. Subsequently, the rod was manually returned to it's seated position. Inspection of the lower latch showed that the latch locking plunger button (screwed on to the bottom of the plunger shaft and retained by a pin through a hole drilled through the button and the plunger shaft) was missing. The shaft failed through the hole drilled for the retaining pin. The button, with the retaining pin intact, was found lodged between the safety rod upper adapter collar and the top of the safety rod thimble top fitting. Analysis of the safety rod latch and accompanying forest guide tube design provided assurance that this type of failure would not cause binding during the "scramming" of the safety rods. Inspection of all of the "K" safety rod lower latches revealed six other latches with missing plunger buttons, and nine with other non-conformances which required latch replacement. A history search conducted by Reactor Engineering Design, Components Handling Group, is included in this report. The history search shows that latch design modifications, as a part of initial development of the latch system and later to improve the delatching operation, were made from 1950 to 1960. These modifications created a condition where latch damage could occur. Video tapes were made during inspection of the safety rod latches in K area and control rod latches in L area. These tapes were reviewed by Reactor Engineering Design Components Handling engineers. The reviews were used for correlation of latch problems reported by the engineers/mechanics making the inspections. The K area tapes showed inspection of 65 of the 66 safety rod latches. The review of the tapes showed the plunger buttons to be missing from five latches. RED-CH reviewed the L Area video taped inspection of 35 control rod clusters (245 latches). No nonconformances were noted.

31040 (WSRC-TR-92-42-011) **Engineering evaluation of the General Motors (GM) diesel rating and capabilities.** Gross, R.E. Westinghouse Savannah River Co., Aiken, SC (United States). Apr 1992. 108p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019933. Source: OSTI; NTIS; INIS; GPO Dep.

K-Reactor's number one GM diesel (GM-IK) suffered recurrent, premature piston pin bushing failures between July 1990 and January 1991. These failures raised a concern that the engine's original design capabilities were being exceeded. Were we asking old engines to do too much by powering 1200 kw (continuous) rated electrical generators? Was excessive wear of the piston pin bushings a result of having exceeded the engine's capabilities (overload), or were the recent failures a direct result of poor quality, poor design, or defective replacement parts? Considering the engine's overall performance for the past 30 years, during which an engine failure of this nature had never occurred, and the fact that 1200 kw was approximately 50% of the engine's original tested capability, Reactor Engineering did not consider it likely that an overloaded engine caused bushing failures. What seemed more plausible was that the engine's failure to perform was caused by deficiencies in, or poor quality of, replacement parts.The following report documents: (1) the results of K-Reactor EDG failure analysis; (2) correlation of P- and C-Reactor GM diesel teardowns; (3) the engine rebuild to blueprint specification; (4) how the engine was determined ready for test; (5) testing parameters that were developed; (6) a summary of test results and test insights; (7) how WSRC determined engine operation was acceptable; (8) independent review of 1200 kw operational data; (9) approval of the engines' 12OOkw continuous rating.

24 POWER TRANSMISSION AND DISTRIBUTION

2404 Health and Safety

Refer also to citation(s) 32004, 32005

2405 Environmental Aspects

31041 (EPA–400R-92-009) **Measurements of electric and magnetic fields in the Waianae, Hawaii area.** Mantiply, E.D. National Air and Radiation Environmental Lab., Montgomery, AL (United States). Jul 1992. 47p. Sponsored by Environmental Protection Agency, Washington, DC (United States). Order Number DE92019891. Source: OSTI; NTIS.

During November 27–30, 1990, the US Environmental Protection Agency (EPA) conducted a measurement survey of electric and magnetic field levels along the southwest coast of Oahu, Hawaii. These measurements were requested by the State of Hawaii to determine the levels of radiofrequency (RF) electric and magnetic fields near Naval radio transmitters at Lualualei. The objective was to determine maximum fields in residential areas. This report documents the measurement results. Also, a few measurements were made of extremely-low-frequency (ELF) electric and magnetic fields at 60 hertz, the frequency used for electrical power.

25 ENERGY STORAGE

2501 Magnetic

Refer also to citation(s) 31166

2506 Thermal

31042 (CONF-921110–9) **Latent heat thermal energy storage for lunar oxygen production.** Solomon, A.D. (Solomon (A.D.), Omer (Israel)); Alexiades, V.; Jacobs, G.; Naney, M.; Olszewski, M. Oak Ridge National Lab., TN (United States). [1992]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Winter annual meeting of the American Society of Mechanical Engineers; Anaheim, CA (United States); 8-13 Nov 1992. Order Number DE92017817. Source: OSTI; NTIS; GPO Dep.

A necessary component of a solar-based lunar oxygen production system is a thermal energy storage module. We discuss some of the heat transfer and phase change problems associated with the design and operation of such a module based on the latent heat of melting of lunar rock. 12 refs.

2509 Batteries

Refer also to citation(s) 31150

31043 (ANL/CP–76687) **Results of advanced batter technology evaluations for electric vehicle applications.** DeLuca, W.H.; Gillie, K.R.; Kulaga, J.E.; Smaga, J.A.; Tummillo, A.F.; Webster, C.E. Argonne National Lab., IL (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States); Electric Power Research Inst., Palo Alto, CA (United States). DOE Contract W-31109-ENG-38. (CONF-9208113–1: 1992 Society of Automotive Engineers (SAE) future transportation technology conference, Costa Mesa, CA (United States), 10-13 Aug 1992). Order Number DE92018766. Source: OSTI; NTIS; GPO Dep.

Advanced battery technology evaluations are performed under simulated electric-vehicle operating conditions at the Analysis & Diagnostic Laboratory (ADL) of Argonne National Laboratory. The ADL results provide insight into those factors that limit battery performance and life. The ADL facilities include a test laboratory to conduct battery experimental evaluations under simulated application conditions and a post-test analysis laboratory to determine, in a protected atmosphere if needed, component compositional changes and failure mechanisms. This paper summarizes the performance characterizations and life evaluations conducted during 1991–1992 on both single cells and multi-cell modules that encompass eight battery technologies [Na/S, Li/MS (M=metal), Ni/MH, Ni/Cd, Ni/Zn, Ni/Fe, Zn/Br, and Pb-acid]. These evaluations were performed for the Department of Energy, Office of Transportation Technologies, Electric and Hybrid Propulsion Division, and the Electric Power Research Institute. The ADL provides a common basis for battery performance characterization and life evaluations with unbiased application of tests and analyses. The results help identify the most-promising R&D approaches for overcoming battery limitations, and provide battery users, developers, and program managers with a measure of the progress being made in battery R&D programs, a comparison of battery technologies, and basic data for modeling.

31044 (NEI-DK–920) **Electrode materials for solid state batteries.** Skaarup, S. (Danmarks Tekniske Hoejskole, Fysisk Laboratorium 3 (DK)); West, K.; Zachau-Christiansen, B. Danmarks Tekniske Hoejskole, Lyngby (Denmark). May 1992 126p. (In Danish, English). Contract ENS-1443/89-3. Order Number DE92562873. Source: OSTI; NTIS.
EFP-89.

The aim was to investigate the structural and electronic conditions that determine the capacity of the electrode materials used in solid state batteries. Chemical, electronic and structural aspects were separated to a certain degree and evaluated independently. It was also of importance to be able to identify the factors of determining influence for the average voltage of the discharge curve. The shape of the discharge curve is important for the practical utility of the battery. Voltages compatible with existing battery systems were of interest. Another aim was to examine the effects of overcharging and discharging to too low voltages. Solid state systems are particularly sensitive to the detrimental effects of parasitic side reaction. The lack of overcharge mechanisms can thus constitute a serious problem. It is also important to find new materials and to contribute to the knowledge of added compounds and their properties in general. One section of the report deals with intercalculation electrodes, and the other with voltage/composition relationships. The former contains main concepts of importance to the understanding and study of ionic intercalation materials, as well as models and formulas to be used in designing and interpreting the results of cycling experiments. The latter section discusses the relative importance of chemical and structural properties to the position and shape of the EMF curve. (AB).

31045 (SAND–92-0874) **Evaluation of flotation for purification of pyrite for use in thermal batteries.** Guidotti, R.A.; Reinhardt, F.W. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019330. Source: OSTI; NTIS; GPO Dep.

The purification of pyrite (FeS_2) used in Li-alloy/FeS_2 thermal batteries by the physical process of flotation was evaluated for reduction of the quartz impurity. The process was compared to the standard process of leaching with concentrated hydrofluoric acid. Flotation was an attractive alternative because it avoided many of the safety and environmental concerns posed by the use of concentrated HF. The effects of particle size and initial purity of the pyrite feed material upon the final purity and yield of the product concentrate were examined for batch sizes from 3.5 kg to 921 kg. Feed materials as coarse as 8 mm and as fine as -325 mesh were treated; the coarse pyrite was ground wet in a rod mill or dry in a vibratory mill to -230 mesh prior to flotation. Both the HF-leached and the flotation-treated pyrite were leached with HCl (1:1 v/v) to remove acid-soluble impurities. The flotation-purified pyrite concentrates were formulated into catholytes; their electrochemical performance was evaluated in both single cells and 5-cell batteries for comparison to data generated under the same discharge conditions for catholytes formulated with HF/HCl-purified pyrite.

29 ENERGY PLANNING AND POLICY

Refer also to citation(s) 30651

31046 (DOE/IG–92040424) **Alaska Power Administration federal power program, Juneau, Alaska: Fiscal year 1991.** USDOE Office of Inspector General, Washington, DC (United States). Office of Assistant Inspector General for Audits; Peat Marwick, Tulsa, OK (United States). 30 Jun 1992. 22p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

This report presents the results of the independent certified public accountants' audit of the Department of Energy's Alaska Power Administration (APA) financial statements as of September 30, 1991. In their opinion, the APA statements are fairly presented in all material respects in accordance with generally accepted accounting principles except as described in their report. Their reports on the APA internal control structure and on its compliance with laws and regulations are also provided. The US Government, through the Department of Energy operates APA at two sites to provide hydroelectric power to Juneau and Anchorage, Alaska.

31047 (DOE/IG–92040425) **Western Area Power Administration: Combined power system financial statements and supplemental schedules.** USDOE Office of Inspector General, Washington, DC (United States). Office of Assistant Inspector General for Audits; Peat Marwick, Salt Lake City, UT (United States). 30 Sep 1991. 34p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

This report presents the results of the independent certified public accountants' audit of the Department of Energy's Western Area Power Administration (Western) financial statements as of September 30, 1991. In their opinion, Western's statements are fairly presented in all material respects in accordance with generally accepted accounting principles. Their reports on Western's internal control structure and its compliance with laws and regulations, as well as a management letter addressing needed improvements are also provided. Western was established in December 1977, and has the responsibility for the Federal electric power marketing and transmission functions in 15 central and western states. Western markets power, as required by existing law, at the lowest possible rates consistent with sound business principles to recover the costs of operation and capital invested in power facilities.

31048 (INIS-mf–14071) **World nuclear power plant capacity.** NUKEM special report. Nuklear-Chemie und -Metallurgie GmbH (NUKEM), Hanau (Germany). Jul 1991 59p. Order Number DE93702566. Source: OSTI; NTIS (US Sales Only); INIS.

This report provides the background information for statistics and analysis developed by NUKEM in its monthly Market Report on the Nuclear Fuel Cycle. The assessments in this Special Report are based on the continuous review of individual nuclear power plant projects. This Special Report begins with tables summarizing a variety of nuclear power generating capacity statistics for 1990. It continues with a brief review of the year's major events regarding each country's nuclear power program. The standard NUKEM Market Report tables on nuclear plant capacity are given on pages 24 and 25. Owing to space limitations, the first year shown is 1988. Please refer to previous Special Reports for data covering earlier years. Detailed tables for each country list all existing plants as well as those expected by NUKEM to be in commercial operation by the end of 2005. An Appendix containing a list of abbreviations can be found starting on page 56. Only nuclear power plants intended for civilian use are included in this Special Report. Reactor lifetimes are assumed to be 35 years for all light water reactors and 30 years for all other reactor types, unless other data or definite decommissioning dates have been published by the operators. (orig./UA).

31049 (ORNL/TM–11664) **Intermediate evaluation of USAID/Cairo energy policy planning project.** Wilbanks, T.J. (Oak Ridge National Lab., TN (United States)); Wright, S.B.; Barron, W.F.; Kamel, A.M.; Santiago, H.T. Oak Ridge National Lab., TN (United States). [1992]. 83p. Sponsored by Agency for International Development, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019336. Source: OSTI; NTIS; GPO Dep.

Three years ago, a team from the Oak Ridge National Laboratory and the Oak Ridge Associated Universities, supplemented by an expert from the US Department of Energy and a senior Egyptian energy professional, carried out what was termed an "intermediate evaluation" of a major energy policy project in Egypt. Supported by USAID/Cairo, the project had concentrated on developing and strengthening an Organization for Energy Planning (OEP) within the Government of India, and it was actually scheduled to end less than a year after this evaluation. The evaluation was submitted to USAID/Cairo and circulated elsewhere in the US Agency for International Development and the Government of Egypt as an internal report. Over the next several years, the USAID energy planning project ended and the functions performed by OEP were merged with planning capabilities in the electric power sector. Now that the major issues addressed by the evaluation report have been resolved, we are making it available to a broader audience as a contribution to the general literature on development project evaluation and institution-building.

2901 Energy Analysis and Modeling

31050 (RISO-R–612) **Systems Analysis Department. Annual progress report 1991.** Larsen, H.; Petersen, K.E. (eds.). Risoe National Lab., Roskilde (Denmark). Systems Analysis. Mar 1992. 63p. Order Number DE92562860. Source: OSTI; NTIS.

The report describes the work of the Systems Analysis Department at Risoe National Laboratory during 1991. The Department is made up of the Cognitive Systems Group, the Risk Analysis group, the Energy Systems Group and the UNEP Collaborating Centre for Energy and Environment. The report includes list of publications, lectures and staff members. (au) (3 tabs., 16 ills., 82 refs.).

2902 Economics and Sociology

Refer also to citation(s) 30575, 31052, 31053, 31054, 31055, 31065, 31066, 32481, 32486

2903 Environment, Health, and Safety

Refer also to citation(s) 30661, 30665, 30758, 31059, 31647, 31681, 31683, 32488

31051 (DOE/EH–0271) **Environment, Safety and Health Progress Assessment of the Hanford Site.** USDOE, Washington, DC (United States). May 1992. 301p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019387. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents the result of the US Department of Energy (DOE) Environment, Safety and Health (ES&H) Progress Assessment of the Hanford Site, in Richland, Washington. The assessment, which was conducted from May 11 through May 22, 1992, included a selective-review of the ES&H management systems and programs of the responsible DOE Headquarters Program Offices the DOE Richland Field Office, and the site contractors. The ES&H Progress Assessments are part of the Secretary of Energy's continuing effort to institutionalize line management accountability and the self-assessment process throughout DOE and its contractor organizations. The purpose of the Hanford Site ES&H Progress Assessment is to provide the Secretary with an independent assessment of the adequacy and effectiveness of the DOE and contractor management structures, resources, and systems to address ES&H problems and requirements. They are not intended to be comprehensive compliance assessments of ES&H activities. The point of reference for assessing programs at the Hanford Site was, for the most part, the Tiger Team Assessment of the Hanford Site, which was conducted from May 21 through July 18, 1990. A summary of issues and progress in the areas of environment, safety and health, and management is included.

31052 (IEE–IC91) **Minutes of Japan-US energy conference/Maui Meeting.** Institute of Energy Economics, Tokyo (Japan). 29 Feb 1992. 263p. (In Japanese). Order Number DE92562525. Source: OSTI; NTIS.

This is the minutes of the 1991 Japan-US energy conference/Maui Meeting. Concerning the global warming issue, a frame plan of the treaty is only worked out, but the concrete policy is still in chaos. The issue is serious in developing countries, in particular, so it is necessary to transfer the technology to prevent pollution to those countries. To stabilize the world energy situation, it is indispensable to stabilize the energy situation in USSR, which necessary cooperation from Western countries. For the oil issue, it is important to talk between oil producing countries and oil consuming countries. As for the coal, it is forecast that a large in import of the to Japan and improvement of competitive strength are promoted. Construction of nuclear power plants is in doldrums both in Japan and the U.S. on the other hand, in developing countries, for example, in China, cooperation from developed countries is important for secure construction and operation of nuclear power plants. Even if practical application of new energy is realized 50 years later, cooperation for technological development is a big task for Japan and the U.S. For technology transfer, organizational and systematical problems on corporate management are forecast, and the knowhow from Japan and the U.S. is useful to solve the problems. 21 figs.

31053 (IEE–SR230) **Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view.** Institute of Energy Economics, Tokyo (Japan). 20 Jan 1992. 38p. (In Japanese). Order Number DE92562526. Source: OSTI; NTIS.

China has serious environmental problems arising in the process of their industrialization and urbanization. To solve them, it is effective to use experiences and technologies of Japan which is an advanced country in environmental technology, so it is important for Japan to give international cooperation. For this purpose, needed are Japan-China cooperative researches to draw up an energy/environment master plan, which facilitates technology transfer. Particularly, a model plant project for desulfurization technology development is effective. It is also important to exchange information on legislation, energy conservation and environmental technology. It is necessary to have a global grasp of the acid rain problem not only in China but in the whole Asia. As an advance step, its is necessary to create an energy/environment fund which aims at exchange of information and technology though business fund has to depend on governmental fund like ODA. 5 figs., 13 tabs.

31054 (IEE–SR231) **Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1.** Institute of Energy Economics, Tokyo (Japan). 20 Jan 1992. 198p. (In Japanese). Order Number DE92562527. Source: OSTI; NTIS.

Concerning a survey of international cooperation of the Japanese energy industry for China's air pollution, an energy and environment problem is summed up in Details 1. Improvement in energy efficiency (energy consumption per unit added value) in China from 1985 to 1988 is explained by enhanced added value of the energy consumption due to brishness in economic activity mostly seen in the light industry and the tertiary industry. Energy conservation in the heavy industry has not necessarily been promoted. with the industrization, China has chronically been short of energy, so development of energy sources, energy conservation and stabilization of energy price are China's issues. The air pollution has partially been improved, but is still serious in substance. An enormous amount of money and knowhow are needed for a substantial improvement. China is highly ranked as Japan's ODA distributee. The cumulative total by 1988 amounts to 3,255 million dollars including donation (17% of the aid) and loans. Besides, cooperation comes from local public organizations and private organizations. Relating to the environmental conservation, cooperation includes those from national, municipal and private organizations as well as ODA. Japan can play a major role in the cooperation with their abundant knowhow and technologies. 59 figs., 11 tabs.

31055 (IEE–SR232) **Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 2.** Institute of Energy Economics, Tokyo (Japan). 20 Jan 1992. 140p. (In Japanese). Order Number DE92562528. Source: OSTI; NTIS.

Concerning a survey of international cooperation of the Japanese energy industry for China's air pollution problem, results of a hearing survey are summed up in Details 2. Primary energy consumption in China is 1 billion coal tons/year with an average annual increase of 5.4%, 76% of which are coal. With a 9.3% growth in GNP and a 0.58 elasticity coefficient, energy consumption/GNP could be reduced 28% in these 10 years. An energy development strategy for the end of this century aims at expansion of energy production, improvement of consumption structure, economic growth by energy conservation and realization of a middle society. For this, needed are conversion to energy intensivity from labor intensivity and development of traffic and transportation. Air pollution is serious by smoke and soot and SO_2 with coal as a major energy source. Particularly, the problem is concentration of industries in special areas. As basic environmental measures,are cited equipment for processing of pollutants to be installed to facilities newly set up and adjustment of a coal price now under study. 5 figs., 27 tabs.

31056 (NEI-DK–904) **Urban ecological initiatives.** Jansson, L. (Dansk Byplanlaboratorium (DK)); Munkstrup, N. Dansk Byplanslaboratorium, Copenhagen (Denmark). 1992 72p. (In Danish). Contract ENS-51191-91.0040. Order Number DE92562871. Source: OSTI; NTIS.

The aim of the project was to gather, discuss and inform about descriptions of activities, and experiences gained, in relation to urban ecological initiatives in Denmark. These initiatives are described and a survey of the most significant articles on urban ecology is presented in addition to a list of bibliographical references on the subject. Urban ecology is defined as "The environment of buildings' matter and energy flow, including the town's production and consumption of energy and resources and its production and disposal of waste products. This happens in conjunction with the environments of buildings' and their surroundings and the towns' citizens' living conditions and interplay with nature." The activities carried out by the "Dansk Byplanlaboratorium" (Danish Town Planning Laboratory) are briefly described. The publication contains data and photographs of projects, carried out in Denmark and abroad, that are related to urban ecology. (AB).

31057 (PNL-SA–20781) **Balancing risk: Ethical issues in risk assessment.** Longstreth, J.D. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206114–15: Annual meeting of the Air and Waste Management Association (AWMA), Kansas City, MO (United States), 21-26 Jun 1992). Order Number DE92019102. Source: OSTI; NTIS; GPO Dep.

The last five decades have seen an explosive growth of information, accompanied by the development of a strong environmental movement. These two factors have been critical contributors to the development of the scientific discipline that has come to be called risk analysis or risk assessment. In this context, risk assessment can be described as an analytic approach used to organize large amounts of information from diverse disciplines so as to evaluate the possible impacts of pollution on human health and the environment. Early efforts in this field focused on the protection of human health. More recently, however, it has been realized that humans and their environment are intimately linked and that environmental impacts must also be evaluated. At some point, it seems likely that the joint goals of protecting human health and the environment may come into conflict. This essay reviews current developments in the assessment of risks both to humans and the environment in order to expose similarities and differences with the ultimate aim of opening a dialogue between scientists in the different disciplines so that evaluation strategies can be designed which will enable decision makers to make trade-offs between human health and environmental risk is an informed and egalitarian way.

31058 (YMP-A–67/1988) **Environmental protection in Finland: National report 1987.** Ministry of the Environment, Helsinki (Finland). Environmental Protection Dept. 1988. 361p. Order Number DE92562933. Source: OSTI; NTIS.

In 1986-87 the Environment Committee of the Organisation for Economic Co-operation and Development (OECD) carried out a Review of Environmental Policies in Finland. As a background document for the Review a publication called 'Environmental Policies in Finland, National Report' was published in July 1987 by the Ministry of the Environment. The preparation of that Report took place in an ad hoc Working Group composed of experts representing different fields of administration and of environmental policy. As environmental policies have developed fairly rapidly much of the information contained in the earlier Report has already proved to be out-of-date. It was therefore considered necessary to produce a new edition now titled 'Environmental Protection in Finland'. This new edition has thus been prepared by updating and rewriting the earlier Report. Much work was, again, done by the members of the above mentioned ad hoc Working Group as well as many other experts in different fields of environmental policy.

2904 Energy Resources

31059 (BNL–47832) **Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems.** Gleason, T.C.J. Brookhaven National Lab., Upton, NY (United States); Gleason (Thomas C.J.), Washington, DC (United States). Jun 1992. 141p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE92019008. Source: OSTI; NTIS; INIS; GPO Dep.

The justification, strategies, and technology options for implementing advanced district heating and cooling systems in the United States are presented. The need for such systems is discussed in terms of global warming, ozone depletion, and the need for a sustainable energy policy. Strategies for implementation are presented in the context of the Public Utilities Regulatory Policies Act and proposed new institutional arrangements. Technology opportunities are highlighted in the areas of advanced block-scale cogeneration, CFC-free chiller technologies, and renewable sources of heating and cooling that are particularly applicable to district systems.

2905 Research, Development, Demonstration, and Commercialization

Refer also to citation(s) 30554, 30555, 30556, 30557, 30558, 30559, 30801, 30854, 31050, 31064, 31070, 31071, 31161, 31162, 31163, 31184, 31185, 32487

31060 (CONF-9208124–1) **National laboratories and CRADAs: Summary.** Hawsey, R.A. Oak Ridge National Lab., TN (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Power electronics technology and applications development, transfer and commercialization workshop; Orlando, FL (United States); 5-7 Aug 1992. Order Number DE92019951. Source: OSTI; NTIS; GPO Dep.

This document presents the relationship between the US DOE and industry concerning technology transfer of research information in the field of high temperature superconductors. In particular, the manner in which cooperative research and development agreements, or CRADAs, are implemented is described via viewgraphs and a short summary. (GHH)

31061 (DOE/CH–9216) **Applied research and development private sector accomplishments: FY90 contracts.** Beskid, N.J.; Devgun, J.S.; Erickson, M.D.; Zielke, M.M. Argonne National Lab., IL (United States). 20 Apr 1992. 55p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-86NV10510. Order Number DE92019279. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes the fiscal year 1990 procurement of contracts with the private sector and the current status of applied research and development conducted for DOE's Office of Technology Development (OTD). This report documents the procurement actions, discusses lessons learned from this activity, and disseminates the results of the procurement to interested parties in DOE and in the private sector.

31062 (SAND–92-1391) **Energy and Environment, August 1992: A Sandia Technology Bulletin.** Parrott, L.; Floyd, H.L.; Goetsch, B.; Doran, L. (eds.). Sandia National Labs., Albuquerque, NM (United States). 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92019468. Source: OSTI; NTIS; INIS; GPO Dep.

A brief overview of selected programs at Sandia is presented. This issue contains high-lights on the following: Reducing risk in nuclear reactors; energy and environment news in brief; eliminating bottlenecks in plastics recycling; new technologies remedy old waste problems; new technologies remedy old waste problems; safe disposal of military components; and heat pipes for stirling engine testing.

2906 Nuclear Energy

Refer also to citation(s) 30905, 30906, 30909, 30920, 30925, 31032

31063 (WHC-SA–1584) **Communicating science and energy in public-lessons from the real world.** Fox, M.R. Westinghouse Hanford Co., Richland, WA (United States). Jun 1992. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-920606–40: American Nuclear Society annual meeting, Boston, MA (United States), 7-12 Jun 1992). Order Number DE92019778. Source: OSTI; NTIS; INIS; GPO Dep.

For over 20 years, the nuclear industry in the United States has been feared, misunderstood, reviled, and abused. After years of this confusion, the American public remains tentative. Today, nuclear energy provides nearly 22% of the nation's electricity enough for 60 million households, and exceeds the total electricity production in the United States for 1954 This is an obscure way of saying that electrical production capacity in the US has quintupled since 1954! In spite of this major contribution the electrical energy mix for the US it is still a poorly understood technology. This paper examines some of the reasonsfor the persistence of the fear and misunderstanding. In so doing the lessons learned from extensive experiences in public communications in science and energy are very instructive, not only for future nuclear construction in the US, but also for other technologies which are similarly misunderstood.

2907 Transport and Storage

Refer also to citation(s) 30594

2910 Conservation

31064 (DOE/CH/10093–149) **America's best: Outstanding state energy grant projects.** Bezzerides, B. (ed.). National Renewable Energy Lab., Golden, CO (United States). Aug 1992. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92010586. Source: OSTI; NTIS; GPO Dep.

This publication provides an overview of representative achievements of state energy grant programs, illustrating states' contributions to reducing energy use in selected end-use sectors. This sample of effective state projects is intended to give readers an idea of the variety and effectiveness of state efforts, and to increase understanding of the diverse avenues states pursue to encourage energy efficiency and use of renewable energy sources. These efforts were supported in part by four grant programs operated through the US Department of Energy (DOE): the State Energy Conservation Program (SECP), the Energy Extension Service (EES), the Institutional Conservation Program (ICP), and the Weatherization Assistance Program (WAP).

31065 (DOE/EM–0075) **Transportation Assessment and Integration (TRAIN): A basis for planning DOE transportation in the 1990s: Final report.** Sorenson, K. (Sandia National Labs., Albuquerque, NM (United States)); Mora, C. (eds.); Grant, P.; Quinn, G.; Green, V.; Halsavor, R. USDOE Office of Environmental Restoration and Waste Management, Washington, DC (United States). Jul 1992. 418p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92018952. Source: OSTI; NTIS; INIS; GPO Dep.

The Transportation Assessment and Integration (TRAIN) Study will provide the EM-561/Transportation Management Division (TMD) with the tools to effectively manage transportation-related activities for the US Department of Energy (DOE)during the 1990s and beyond. The recommendations listed represent issues that span transportation activities associated with all DOE organizations. These recommendations reflect the activities required to position the TMD for the multi-task role that will be required in the decade of the 1990's. The TRAIN activity is structured as a hierarchy of decisionmaking and data-gathering committees. This structure allows a flexible, responsive approach to managing the TRAIN activities.

2920 Supply, Demand, and Forecasting

Refer also to citation(s) 30594

31066 (DOE/EIA–0202(92/3Q)) **Short-term energy outlook: Quarterly projections, Third quarter 1992.** USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use. Aug 1992. 32p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019683. Source: OSTI; NTIS; INIS; GPO; GPO Dep.

The Energy Information Administration (EIA) prepares quarterly, short-term energy supply, demand, and price projections for publication in February, May, August, and November in the Short-Term Energy Outlook (Outlook). An annual supplement analyzes the performance of previous forecasts, compares recent cases with those of other forecasting services, and discusses current topics related to the short-term energy markets. (See Short-Term Energy Outlook Annual Supplement, DOE/EIA-0202.) The principal users of the Outlook are managers and energy analysts in private industry and government. The forecast period for this issue of the Outlook extends from the third quarter of 1992 through the fourth quarter of 1993. Values for the second quarter of 1992, however, are preliminary EIA estimates (for example, some monthly values for petroleum supply and disposition are derived in part from weekly data reported in the Weekly Petroleum Status Report) or are calculated from model simulations using the latest exogenous information available (for example, electricity sales and generation are simulated using actual weather data). The historical energy data are EIA data published in the Monthly Energy Review, Petroleum Supply Monthly, and other EIA publications. Minor discrepancies between the data in these publications and the historical data in this Outlook are due to independent rounding.

31067 (IEE–SR234) **Survey of the petroleum trend in Europe.** Institute of Energy Economics, Tokyo (Japan). 25 Feb 1992. 140p. (In Japanese). Order Number DE92562530. Source: OSTI; NTIS.

This report makes a review of EC's energy policy and also an examination and analysis of responses of every country including IEA to the energy trend in Europe brought by the Gulf War. Fundamentals of EC's energy policy in the 1980s are prevention of another oil crisis and reaction to the high petroleum price. In the 1990s, energy conservation, the CO_2 issue, the East Europe/USSR issue are newly added as major issues to the existing petroleum problem. As responses by country including IEA, IEA member nations announced simultaneously with the outbreak of the Gulf war that they would release to the market additionally a total of 2.5 million barrels/day on which they consented previously. France which is not an IEA member, jointed in carrying out measures immediately taken by IEA and undertook a quota of 126,000 barrels/day. They coped with it with their energy saving policy. The UK was obliged to release 120,000 barrels/day to the market. A quota to Italy was 530,000 tons/month. They coped with it with a shift of the power generation fuel to natural gas, and others. 10 figs., 33 tabs. tabs.

31068 (NEI-NO–244) **Stochastic methods in energy planning: Application to expansion planning and short-term load forecasting.** Mo, B. Trondheim Univ. (Norway). Norges Tekniske Hoegskole. 1991 210p. Order Number DE92563012. Source: OSTI; NTIS.

This thesis discusses the treatment of uncertain variables within the field of energy planning. Examples of uncertain external variables are future energy demand, future prices of energy carriers and water inflow to water reservoirs. The uncertainty in the planning variables can be accounted for in two main ways: Uncertainty can be explicitly modeled in the planning process, and uncertainty can be forecasted to give minimum expected error in defined external variables. The first part of this thesis deals with generation expansion planning. The major input variables to this problem that are uncertain, are future energy demand and future energy prices. The main result from the first part of this thesis is a method which can take the uncertainty in these variables into account when expansion planning is performed. The stochastic generation expansion planning problem is solved by means of stochastic dynamic programming while the uncertain variables are modeled by Markov models. The second part of this thesis is concentrated on minimizing the uncertainty in one of the major uncertain variables to the energy planning problem. The future energy demand is input to the short, medium and long-term operation planning as well as to expansion planning. We have concentrated on short-term load forecasting (1 to 24 hours ahead). The short-term load forecasting problem is solved by a newly developed model. The main improvement of the model is that different weather variables (temperature, wind speed and sunshine) affect the load through different time constants. The model parameters are estimated by recursive parameter estimation, the model's weather dependence is therefore self adjusting. The model structure is such that the model parameters have physical meaning to the users of the model. 119 refs., 43 figs., 12 tabs.

2930 Policy, Legislation, and Regulation

Refer also to citation(s) 31057, 31058, 31067, 32488

31069 (YMP-A–79/1989) **Report on the enforcement of the air pollution control act in the province of central Finland. Part 2: Development trends in pollutant emissions and air quality, pollution control costs.** Ivalo, L. Ministry of the Environment, Helsinki (Finland). Environmental Protection Dept. 1989. 104p. (In Finnish). Order Number DE92562934. Source: OSTI; NTIS.

In the early 1980s, emissions of pollutants into the air from industries in the County of Central Finland subject to notification to the authorities amounted to some 25,000 tons of sulphur dioxide, 3,100 tons of nitrogen oxides, and 6,400 tons of particles. By 1987, sulphur dioxide emissions were down by 65 per cent, and particles emissions by 75 per cent. There has been a slight increase in nitrogen oxides emissions as of the mid-80s. The decrease in emissions and the favourable development in air quality is above all due to changes in industrial production, new processes in energy supply to industry and heat saving in processes. Moreover, the decisions issued by the County Government on the basis of the Clean Air Act and the Council of State decisions have been of major importance in the limitation of sulphur and particle emissions. The building of district heating networks has also contributed to improving local air quality. Additionally, industry and energy production have contributed to better air quality by taking into use improved technology which is favourable both for production and for air quality. The total value of such projects in the period 1980-87 amounted to some 150 million FIM.

2940 Fossil Fuels

Refer also to citation(s) 30554, 30555, 30556, 30557, 30558, 30559, 30576, 30577, 30584, 30594, 31066, 31067

31070 (ANL/EAIS/TM–39, pp. 11-79) **Selected characteristics of twelve clean coal technologies.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace.* 309p. Order Number DE91009851. Source: OSTI; NTIS.

How extensively the clean coal technologies (CCTs) can penetrate foreign markets will depend on how well the authors match the characteristics of the technologies to circumstances in individual countries. Also, US vendors will probably not be selected unless their technology packages are more attractive than those offered by other international vendors. This section briefly characterizes important aspects of the 12 CCTs selected for their representatives and potential applicability. The 12 CCTs discussed are: coal flotation, coal-water mixtures, slagging combustion, integrated gasification combined-cycle systems, atmospheric fluidized-bed combustion, pressurized fluidized-bed combustion, limestone-injection multistage-burner technology, gas-reburning sorbent-injection technology, dual-alkali flue gas desulfurization, spray-dryer flue gas desulfurization, Noxso Process, and selective catalytic reduction. For each CCT the following are discussed: applicable market, influence of coal type, plant size and modularity considerations, status of commercialization, capital and operating costs, plant performance, part-load operation, reliability and availability, atmospheric emissions, production of solid waste, consumable requirements, plant complexity and operability, and general comments.

31071 (ANL/EAIS/TM-39, pp. 176-181) **Status of the US Department of Energy's Clean Coal Technology Demonstration Program.** Szpunar, C.B.; Gillette, J.L. Argonne National Lab., IL (United States). Jul 1990. In *Comparative analyses for selected clean coal technologies in the international marketplace*. 309p. Order Number DE91009851. Source: OSTI; NTIS.

The US DOE CCT (Clean Coal Technology) Demonstration Program is being cofunded by the government and industry to demonstrate a new generation of innovative coal-based technologies and, over the next decade, move them into the commercial marketplace through demonstration. The program has given special consideration to (1) projects the demonstrate retrofit technologies that can be applied to the largest number of existing sources (especially sources that, because of their size and location, contribute to transboundary air pollution) and (2) technologies that can be applied to facilities currently dependent on the use of high-sulfur coal. The paper briefly describes 13 projects in either the operations, construction, or design and permit phases.

31072 (DOE/EIA-0109(92/07)) **Petroleum supply monthly, July 1992.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. 30 Jul 1992. 156p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019074. Source: OSTI; NTIS; GPO; GPO Dep.

The Petroleum Supply Monthly (PSM) is one of a family of three publications produced by the Petroleum Supply Division within the Energy Information administration (EIA) reflecting different levels of data timeliness and completeness. The other two publications are the Weekly Petroleum Status Report (WPSR) and the Petroleum Supply Annual (PSA). Data presented in the PSM describe the supply and disposition of petroleum products in the United States and major US geographic regions. The data series describe production, imports and exports, inter-Petroleum Administration for Defense (PAD) District movements, and inventories by the primary suppliers of petroleum products in the United States (50 States and the District of Columbia). The reporting universe includes those petroleum sectors in Primary Supply. Included are: petroleum refiners, motor gasoline blenders, operators of natural gas processing plants and fractionators, inter-PAD transporters, importers, and major inventory holders of petroleum products and crude oil. When aggregated, the data reported by these sectors approximately represent the consumption of petroleum products in the United States.

31073 (DOE/EIA-0520(92/07)) **International Petroleum Statistics Report, July 1992.** USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use. 29 Jul 1992. 60p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019389. Source: OSTI; NTIS; GPO; GPO Dep.

The International Petroleum Statistics Report presents data on international oil production, consumption, imports, exports, and stocks. The report has four sections. Section 1 contains time series data on world oil production, and on oil consumption and stocks in the organization for Economic Cooperation and Development (OECD). This section contains annual data beginning in 1980, and monthly data for the most recent two years. Section 2 presents an oil supply/consumption balance for the market economies (i.e. non-communist countries). This balance is presented in quarterly intervals for the most recent two years. Section 3 presents data on oil imports by OECD countries. This section contains annual data for the most recent year, quarterly data for the most recent two quarters, and monthly data for the most recent twelve months. Section 4 presents annual time series data on world oil production and oil stocks consumption, and trade in OECD countries. World oil production and OECD consumption data are for the years 1970 through 1991; OECD stocks from 1973 through 1991; and OECD trade from 1982 through 1991.

2960 Electric Power

Refer also to citation(s) 31066, 31161, 31162, 31163, 31184, 31185, 32524

31074 (NEI-FI-166) **A preliminary study of the energy management system of middle-sized electric utilities.** Raemoe, T. (Mikkelin teknologiakeskus Oy, Mikkeli (Finland)); Kolehmainen, P. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1992. 39p. (In Finnish). Project KTM-268/881/90. Order Number DE92562897. Source: OSTI; NTIS.

The aim of the study was to find and analyse the potential problems in both the strategical and operative decision making situations in electric energy and district heating purchase, production and distribution activities of a middle-sized city electric utility. The study was carried out by interviewing a large number of employees of the utilities, responsible of wide variety of activities in energy management. Problems, ideas, expectations and other comments brought out in the interviews were classified and grouped according to the activity concerned and the organization level of interviewed person. The comment lists were analysed paying special attention to the bindings between activities and bindings between the organization levels inside each activity. As a result, the need for improved management and integration of information available in various computer systems used in energy works was found to be the most common reason for problems arised. Particularly, the efforts to cost-efficiency by means of 'management by results indicates a need for developing a specialized executive information and decision support system, which would assist e.g. in up-to-date follow-up of different activities, projects etc. Other possible areas for developing found, were support for daily operative energy management, and organizational and systems development of customer service.

2980 Consumption and Utilization

Refer also to citation(s) 30594, 31089

31075 (DOE/EIA-0555(92)/3) **Derived annual estimates of manufacturing energy consumption, 1974-1988.** USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use. 5 Aug 1992. 123p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019510. Source: OSTI; NTIS; GPO; GPO Dep..

This report presents a complete series of annual estimates of purchased energy used by the manufacturing sector of the US economy, for the years 1974 to 1988. These estimates interpolate over gaps in the actual data collections, by deriving estimates for the missing years 1982-1984 and 1986-1987. For the purposes of this report, "purchased" energy is energy brought from offsite for use at manufacturing establishments, whether the energy is purchased from an energy vendor or procured from some other source. The actual data on purchased energy comes from two sources, the US Department of Commerce Bureau of the Census's Annual Survey of Manufactures (ASM) and EIA's Manufacturing Energy Consumption Survey (MECS). The ASM provides annual estimates for the years 1974 to 1981. However, in 1982 (and subsequent years) the scope of the ASM energy data was reduced to collect only electricity consumption and expenditures and total expenditures for other purchased energy. In 1985, EIA initiated the triennial MECS collecting complete energy data. The series equivalent to the ASM is referred to in the MECS as "offsite-produced fuels."

2990 Unconventional Sources and Power Generation

Refer also to citation(s) 30801, 31059

30 DIRECT ENERGY CONVERSION

3001 MHD Generators

31076 (CONF-9112129–1) **A distributed data acquisition and centralized data reduction system for flexible and efficient measurements.** Phillip, T.; Jang, Ping-Rey; Benton, R.D. Mississippi State Univ., MS (United States). Diagnostic Instrumentation and Analysis Lab. [1991]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-80ET15601. From International Society for Mini and Microcomputers (ISMM) international symposium on mini and microcomputers; Long Beach, CA (United States); 11-13 Dec 1991. Order Number DE92019021. Source: OSTI; NTIS; GPO Dep.

The Diagnostic instrumentation and analysis Laboratory (DIAL) at Mississippi State University (MSU) is developing nonintrusive optical diagnostic instrumentation to characterize a magnetohydrodynamic (MHD) gas stream. The optical instrumentation systems are being developed, as part of the Us Department of Energy (DOE) development program for the MHD power process, to measure gas temperature profiles, gas velocity and turbulence intensity profiles, and average particle size and particle size distribution, etc. since these instruments are primarily intended for field use, most of them have been developed as stand-alone systems, providing for ease of operation. Each stand-alone system, also called a target system, has the capability to acquire data, do a preliminary analysis, and display the result. The data from various instrumentation systems are logged to a central computer for detailed analysis, and to trace the history of instrument operation through an IEEE 488 based network. This system has been used with success for over five years in our field measurements at different locations in the US. Although the implementation presented here is based on a particular environment, the principles described are applicable in a variety of situations.

31077 (DOE/ET/15601–42) **Diagnostic development and support of MHD test facilities: Technical progress report, July–September 1990.** Shepard, W.S.; Cook, R.L. Mississippi State Univ., MS (United States). Diagnostic Instrumentation and Analysis Lab. [1990]. 72p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-80ET15601. Order Number DE92019511. Source: OSTI; NTIS; INIS; GPO Dep.

The Diagnostic Instrumentation and Analysis Laboratory (DIAL) at Mississippi State University (MSU) is developing diagnostic instruments for MHD power train data acquisition and for support of MHD component development test facilities. Microprocessor-controlled optical instruments, initially developed for Heat Recovery/Seed Recovery support, are being refined, and new systems to measure temperatures and gas-seed-slag stream characteristics are being developed. To further data acquisition and analysis capabilities, the diagnostic systems are being interfaced with DIAL's computers. Technical support for the diagnostic needs of the national MHD research effort is being provided. DIAL personnel will also cooperate with government agencies and private industries to improve the transformation of research and development results into processes, products and services applicable to their needs.

3003 Thermoelectric Generators

Refer also to citation(s) 31263

3005 Fuel Cells

Refer also to citation(s) 31188

31078 (ANL/CP–76365) **ANL's research and development of alternative components for MCFC's.** Kucera, G.H.; Brown, A.P.; Roche, M.; Chu, D.; Indacochea, E. Argonne National Lab., IL (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920748–1: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92018788. Source: OSTI; NTIS; GPO Dep.

Molten carbonate fuel cell (MCFC) systems are currently limited by several technical problems. The objectives of this project are to focus on these problems and develop materials . and cell components that will ameliorate or eliminate them. Specifically, new ceramic materials are being investigated for dimensionally stable electrode materials with improved chemical and electrochemical properties over the present NiO cathode and Ni/Cr and Ni/Al anodes. Also, alternative electrolyte formulations to the present Li_2CO_3-K_2CO_3 are being studied.

31079 (CONF-920748–14) **MCFC diagnostics: HCl detection.** Palmer, B.A.; Oldenborgn, R.C.; Funk, D.J. Los Alamos National Lab., NM (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. From US Department of Energy contractors review meeting on fuel cells; Morgantown, WV (United States); 14-15 Jul 1992. Order Number DE92001292. Source: OSTI; NTIS; GPO Dep.

Molten carbonate fuel cells (MCFC) are being developed for large- scale power generation. One source of fuel is coal gasifiers, which presents the problem of coal gas contaminants and their effect on MCFC; HCl is the most serious and hence needs to be monitored. Different methods of detecting HCl in the gas phase were evaluated, and laser diode absorption is the most suitable. Temperature sensitivity and spectral interferences are discussed; it is shown that the P10 spectral line is the best. A diode for the P10 line is on order; experiments using the P5 line show the line to be unacceptable (overlap with CH_4 line). Future planned work is outlined briefly. (DLC)

31080 (DOE/ER/80910–92/C0058) **Perovskite solid electrolytes for SOFC.** Sammells, A.F. Eltron Research, Inc., Aurora, IL (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER80910. (CONF-920748–7: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92019981. Source: OSTI; NTIS; GPO Dep.

Selected perovskite solid electrolytes incorporated into research size fuel cells have shown stability for $>$ 4000 hours at 600°C. Perovskite lattice requirements which favor low E_a for ionic conduction include (i) that the perovskite lattice possess a moderate enthalpy of formation, (ii) perovskite lattice possess large free volumes, (iii) that the lattice minimally polarizes the mobile ion and (iv) that the crystallographic saddle point r_c for ionic conduction is $\simeq 1$.

31081 (DOE/ER/81156–92/C0059) **Jet vapor deposition of thin films for solid oxide and other fuel cell applications.** Halpern, B.L.; Schmitt, J.J.; Golz, J.W.; Di, Y. Jet Process Corp., New Haven, CT (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-91ER81156. (CONF-920748–6: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92019980. Source: OSTI; NTIS; GPO Dep.

JVD has demonstrated promise for thin film SOFC research and fabrication. Micron scale YSZ films made via JVD are dense and pinhole free; they seal highly porous electrode surfaces and are gas tight. There is little chance for impurity incorporation in JVD, and the evidence points to oxygen ion conductivity.

31082 (DOE/MC/24221–92/C0056) **Advanced water-cooled phosphoric acid fuel cell development.** Scheffler, G.W.; Kemp, F.S. International Fuel Cells Corp., South Windsor, CT (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-88MC24221. (CONF-920748–5: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92019979. Source: OSTI; NTIS; GPO Dep.

The final task of the program addressed the testing of the three short stacks described above. The overall objective of this series of short stack tests was to verify the operation of the advanced cell design at both on-site and electric utility operating conditions. The small area development stack was operated first at atmospheric pressure (to compare its characteristics to previous atmospheric tests) and then at 120 psia to examine its ability to operate at electric utility conditions. The 10-ft^2 stack was also run at pressurized conditions to verify the scaling characteristics of the features developed in this program . The small area development stack was assembled and successfully tested for 3050 hours. The first 2380 hours of testing was conducted at atmospheric pressure, and the final 670 hours was at 120 psia pressurized conditions. As shown in Figure 1, performance was stable throughout testing. Intermediate and post test inspections of the stack showed parts to be in generally good condition with no anomalies.

31083 (DOE/MC/25167–2986) **Solid oxide fuel cell processing using plasma arc spray deposition techniques: Final report.** Ray, E.R.; Spengler, C.J.; Herman, H. Westinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Conversion Dept. Jul 1991. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-88MC25167. Order Number DE91002066. Source: OSTI; NTIS; GPO Dep.

The Westinghouse Electric Corporation, in conjunction with the Thermal Spray Laboratory of the State University of New York, Stony Brook, investigated the fabrication of a gas-tight interconnect layer on a tubular solid oxide fuel cell with plasma arc spray deposition. The principal objective was to determine the process variables for the plasma spray deposition of an interconnect with adequate electrical conductivity and other desired properties. Plasma arc spray deposition is a process where the coating material in powder form is heated to or above its melting temperature, while being accelerated by a carrier gas stream through a high power electric arc. The molten powder particles are directed at the substrate, and on impact, form a coating consisting of many layers of overlapping, thin, lenticular particles or splats. The variables investigated were gun power, spray distance, powder feed rate, plasma gas flow rates, number of gun passes, powder size distribution, injection angle of powder into the plasma plume, vacuum or atmospheric plasma spraying, and substrate heating. Typically, coatings produced by both systems showed bands of lanthanum rich material and cracking with the coating. Preheating the substrate reduced but did not eliminate internal coating cracking. A uniformly thick, dense, adherent interconnect of the desired chemistry was finally achieved with sufficient gas- tightness to allow fabrication of cells and samples for measurement of physical and electrical properties. A cell was tested successfully at 1000°C for over 1,000 hours demonstrating the mechanical, electrical, and chemical stability of a plasma-arc sprayed interconnect layer.

31084 (DOE/MC/27168–92/C0051) **Understanding of carbonate fuel cell resistance issues for performance improvement.** Yuh, C.Y.; Farooque, M.; Johnsen, R. Energy Research Corp., Danbury, CT (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-90MC27168. (CONF-920748–9: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92019976. Source: OSTI; NTIS; GPO Dep.

The overall objective of the current Task 6 under Contract AC21-90MC27168 is to develop understanding as well as quantification of cell ohmic resistance in carbonate fuel cell. The important resistance-contributing interfaces and elements are being investigated in high-temperature out-of-cell resistance experiments, using an AC-impedance technique. Ohmic resistance loss in a state-of-the-art carbonate fuel cell contributes about 65 mV loss at BOL (beginning-of-life). It may increase to about as much as 145 mV after 40,000 hours. Its reduction will offer further improvement in fuel cell power plant efficiency. The important resistance contributing elements/interfaces are illustrated in Figure 1. The majority of the ohmic loss attributed to electrolyte matrix (ionic) and cathode-side hardware (electronic). The ohmic loss due to anode-side hardware can generally be neglected because the anode-side hardware is surface protected resulting in very little surface oxide formation. The ohmic resistance of the electrodes is also negligible. The matrix ionic resistance is influenced by many factors: electrolyte conductivity, matrix porosity, tortuosity, electrolyte fill level and matrix thickness. At present, matrix contributes to > 300 mΩcm^2 (>70% of the total cell ohmic resistance) and is the major resistance contributor.

31085 (DOE/MC/27394–92/C0050) **Impact of protective oxides on cathode-side resistances in MCFCs.** Remick, R.J.; Benjamin, T.G.; Osif, T.L. M-C Power Corp., Burr Ridge, IL (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-90MC27394. (CONF-920748–10: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92019973. Source: OSTI; NTIS; GPO Dep.

The objective of this work is to evaluate methods for forming protective chromium oxide and lithium ferrite layers ex-situ on the cathode-side stainless steel hardware of a molten carbonate fuel cell prior to cell/stack assembly. It is expected that once these ex-situ processes are identified it will also be possible to dope these protective oxide layers and achieve higher electrical conductivity and lower contact resistances than are experienced with the protective oxide layers which form in-situ when the cell/stack is first heated to operating temperature.

31086 (DOE/PC/79931–T13) **Oxygen electrode reaction in molten carbonate fuel cells: Final report, September 15, 1987–September 14, 1990.** Appleby, A.J.; White, R.E. Texas A and M Univ., College Station, TX (United States). Dept. of Chemical Engineering. 7 Jul 1992. 166p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-87PC79931. Order Number DE92040180. Source: OSTI; NTIS; GPO Dep.

Contains thesis by Bhasker B. Dave: Oxygen reduction in lithium carbonate melt: Determination of electrode kinetic and mass transfer parameters.

Molten carbonate fuel cell system is a leading candidate for the utility power generation because of its high efficiency for fuel to AC power conversion, capability for an internal reforming, and a very low environmental impact. However, the performance of the molten carbonate fuel cell is limited by the oxygen reduction reaction and the cell life time is limited by the stability of the cathode material. An elucidation of oxygen reduction reaction in molten alkali carbonate is essential because overpotential losses in the molten carbonate fuel cell are considerably greater at the oxygen cathode than at the fuel anode. Oxygen reduction on a fully-immersed gold electrode in a lithium carbonate melt was investigated by electrochemical impedance spectroscopy and cyclic voltammetry to determine electrode kinetic and mass transfer parameters. The dependences of electrode kinetic and mass transfer parameters on gas composition and temperature were examined to determine the reaction orders and the activation energies. The results showed that oxygen reduction in a pure lithium carbonate melt occurs via the peroxide mechanism. A mass transfer parameter, $D_O^{1/2}C_O$, estimated by the cyclic voltammetry concurred with that calculated by the EIS technique. The temperature dependence of the exchange current density and the product $D_O^{1/2}C_O$ were examined and the apparent activation energies were determined to be about 122 and 175 kJ/mol, respectively.

31087 (NUTEK-NYEL–92-1) **Development of catalysts for internal reforming in molten carbonate fuel cell.** Pirjamali, M. (Royal Inst. of Tech., Stockholm (SE). Dept. of Chemical Technology). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Sep 1991. 33p. Project NUTEK-616-048. (TRITA-KT–91-11). Order Number DE92563031. Source: OSTI; NTIS.

Several nickel based catalysts are made and tested. So far, none of them seems to have the required activity, in the presence of molten carbonate, to convert enough methane in the cell for the electric power generation. (au).

31088 (PNL-SA–21162) **Alternative materials for solid oxide fuel cells: Factors affecting air-sintering of chromite interconnections.** Chick, L.A.; Bates, J.L. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920748–4: US Department of Energy contractors review meeting on fuel cells, Morgantown, WV (United States), 14-15 Jul 1992). Order Number DE92019356. Source: OSTI; NTIS; GPO Dep.

The purpose of this research is to develop alternative materials for solid oxide fuel cell (SOFC) interconnections and electrodes with improved electrical, thermal and electrochemical properties. Another objective is to develop synthesis and fabrication processes for these materials whereby they can be consolidated in air into

SOFCs. The approach is to (1) develop modifications of the current, state-of-the-art materials used in SOFCs, (2) minimize the number of cations used in the SOFC materials to reduce potential deleterious interactions, (3) improve thermal, electrical, and electrochemical properties, (4) develop methods to synthesize both state-of-the-art and alternative materials for the simultaneous fabrication and consolidation in air of the interconnections and electrodes with the solid electrolyte, and (5) understand electrochemical reactions at materials interfaces and the effects of component compositions and processing on those reactions.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

31089 (KTM/E-B–111) **The energy contents of products and the indirect energy consumption of households.** Maentylae, K. (Technical Research Centre of Finland, Espoo (Finland). Lab. of Urban Planning and Building Design); Ranne, A.; Pasi, S.; Niemi, E.; Ollila, P.; Ritvanen, K.; Tanskanen, E. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1992. 177p. (In Finnish). Project KTM-15/881/91. Order Number DE92562895. Source: OSTI; NTIS.

The total energy consumption in Finland was 1130 PJ in 1985. The share of the households was 440-470 PJ, of which 59 % was indirect consumption. In 1981-85 the energy consumption of households increased by 7 %. The indirect energy consumption was biggest in the fields of foodstuff and transport, but the fastest growth was measured in consumption groups connected with people's leisure time and hobbies. More than one half of the energy consumed by households was fossil fuels, one fifth was electricity, another fifth was heating energy and the rest was indigenous fuels. Concerning foodstuffs the report contains information of the energy contents (covering whole product chains) of milk, meat, corn, beverage and confectionary products as well as fruits and vegetables. The energy content of milk products varies between 5-90 MJ/kg and of meat products between 2-80 MJ/kg. The energy contents of beverage packings as well as different paper, carton and plastic brands has been compared in the report. The usage characteristics of the materials have a notable influence on the energy contents of packings. Plastic is often a more energy-economically packing material compared to paper. In the case of residential houses least energy is bounded up with houses with wooden structures and most energy with houses with brick- or stonebased materials and structures. The share of indirect energy is 16- 17 % of the total consumption of new residential houses, when the period of use of houses is 50 years.

31090 (TKKK-C–2/1991) **Exergy measure for the energy use of Finland economy in 1985.** Malaska, P.; Groenfors, K. Turku School of Economics (Finland). 1991. 90p. (In Finnish). Order Number DE92562905. Source: OSTI; NTIS.

Exergy concept based on the second law of thermodynamics is a generalization of Gibb's free energy concept. It opens up new possibilities to audit the use of energy and other natural resources as well as appraise the effectivity of the use, and diagnose ineffectivities of technology and wasting of resources. The term exergy has become generally accepted since 60s. In this research the exergy measure is applied to audit the energy use of Finland economy in 1985. The results indicate that the exergy efficiency is only about one half of the efficiency of energy measure. This has led the researchers to conclude that there are a lot of potential for improving production technology as well as for savings in the use of energy.

3201 Buildings

Refer also to citation(s) 30827, 31064, 31130, 31137, 31145, 31386, 31396

31091 (BFR-D–2-92) **Demand controlled ventilating systems: Sensor market survey.** Raatschen, W. Swedish Council for Building Research, Stockholm (Sweden). Dec 1991. 81p. Order Number DE92563093. Source: OSTI; NTIS.

IEA Energy Conservation in Buildings and Community Systems Programme.

In this book is presented a Sensor Product Survey. The work is a result of efforts made within the frame of International Energy Agency and its programme Energy Conservation in Buildings and Community Systems. A first market survey on humidity and indoor air quality sensors was undertaken in 1988. The results were published in the Subtask A report of IEA-Annex 18. It was obvious at that time that the worldwide knowledge of sensor-performance (especially for gas sensors) was very poor and of course insufficient for the use of such sensors in Demand Controlled Ventilating systems.

31092 (BFR-D–5-92) **SAS Froesundavik. An office heated and cooled by groundwater.** Johansson, Sam (AIB Consulting Engineers, Solna (SE)). Swedish Council for Building Research, Stockholm (Sweden). 1991. 27p. Order Number DE92563094. Source: OSTI; NTIS.

This publication describes how groundwater can be used to supply heating and cooling services to a large office complex. The operating principle depends on the fact that the building is sited on a substantial esker, making it possible to store heat from the summer for use during the winter, and cold from the winter for use during summer, in the groundwater body (or aquifer) in the esker. This simple principle does, however, require advanced technology. The office complex, SAS new headquarters at Froesundavik, is at Brunnsviken on the northern edge of Stockholm. This energy installation is the first larger installation of its kind in Sweden, and is therefore of considerable value as a reference installation for new energy technology. The results indicate that the system is both profitable and reliable: the need for purchased energy has been reduced by about 65% relative to that of a conventional installation.

31093 (BFR-D–7-92) **Glazed courtyard at Taernan: Thermal performance of the courtyard and surrounding residential buildings. Measurements and calculations.** Wall, M. (Lund Inst. of Tech. (SE). Dept. of Building Science). Swedish Council for Building Research, Stockholm (Sweden). 1992. 112p. Project BFR-860333-6. Order Number DE92563064. Source: OSTI; NTIS.

There is a need for the temperature in a glazed space and the energy requirement in the surrounding buildings to be calculated already during the design phase. In order to increase knowledge, measurements and calculations have been carried out for a glazed courtyard with passive climatic control at the block Taernan, Landskrona. The measurements comprise, inter alia, the outside climate, the temperature at different levels inside the glazed space, control of vents and solar control curtains, and the energy requirements in the surrounding buildings. The measurements show that the temperature in the courtyard is greatly affected by the outside climate. Owing to the geometrical configuration of the courtyard with surrounding buildings, the temperature level is low and during cold periods there is a high risk of frost. Since the temperature level in the glazed courtyard is low, the reduction of energy requirement in the surrounding buildings is only marginal and cannot justify glazing of the courtyard. The temperature at different levels in the courtyard has been calculated with the computer program DEROB-LTH and compared with measurements. Agreement is very good, but further improvements will be made to the computer program. Calculations have also been made to study alternative configurations. The effect due to changing single glazing to double or triple glazing, and changing heat storage capacity and orientation, has been discussed. 8 refs., 80 figs., 5 tabs.

31094 (BFR-R–13-92) **Heat measurements in fluid systems.** Fahlen, P. (Swedish National Testing and Research Inst., Boraas (SE)). Swedish Council for Building Research, Stockholm (Sweden). 1992. 161p. (In Swedish). Project BFR-850952-0. Order Number DE92563065. Source: OSTI; NTIS.

The most important aspects of heat measurements in fluids with relevance for heating systems in buildings or district heating systems are reviewed. The precision of measurements are discussed, in particular the weighting of several uncertainties to one total uncertainty for the 'heat'-entity. Recommendations for installation of meters are given in the form of rules of the thumb. 11 refs., 61 figs.

31095 (CONF-9202108–Summ.) **Proceedings of the DOE/Advanced Heat Exchangers Program Review: Summary report.** Energetics, Inc., Columbia, MD (United States). Feb 1992. 365p.

Sponsored by USDOE, Washington, DC (United States). From Advanced heat exchangers; Herndon, VA (United States); 13 Feb 1992. Order Number DE92014385. Source: OSTI; NTIS; GPO Dep.

Semiannual review meetings of the USDOE's Advanced Heat Exchanger Program with the objective of reviewing ongoing and recently completed project activities. Personnel from industrial contractors and National Laboratories present technical aspects of their projects. The projects deal with high temperature heat exchangers for waste heat recuperation and process heat exchange and other areas such as materials performance and heat transfer enhancement. Topics presented are high pressure heat exchangers, ceramic heat exchangers, enhanced tubes, and materials studies to include silicon carbide whiskers and alumina. (GHH)

31096 (CONF-921152--1) **Triple-effect absorption chiller cycles.** DeVault, R.C. (Oak Ridge National Lab., TN (United States)); Grossman, G. Oak Ridge National Lab., TN (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From International gas research conference; Orlando, FL (United States); 16-19 Nov 1992. Order Number DE92014442. Source: OSTI; NTIS; GPO Dep.

Gas-fired absorption chillers are widely used for air-conditioning buildings. Even the highest efficiency double-effect absorption chillers used more primary energy for air-conditioning buildings than the better electric chillers. Two different triple-effect absorption chiller cycles are capable of substantial performance improvement over equivalent double-effect cycles. One cycle uses two condensers and two absorbers to achieve the "triple effect." A second cycle, the Double-Condenser Coupled Triple-Effect, uses three condensers as well as a third condenser subcooler (which exchanges heat with the lowest temperature first-effect generator). These triple-effect absorption cycles have the potential to be as energy efficient (on a primary fuel basis) as the best electric chillers. 19 refs.

31097 (DOE/CE/15525--T3) **Advanced Cooling Technology, Inc. quarterly technical progress report.** Myers, H.S. Advanced Cooling Technology, Inc., Lexington, KY (United States). 29 Jul 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-91CE15525. Order Number DE92018682. Source: OSTI; NTIS; GPO Dep.

Advanced Cooling Technology (ACT), Inc., will perform the following tasks in order to develop an improved, more reliable and more marketable version of their ACT Evaporative Subcooling System: (1) Develop a more stable pump by reducing vibration levels; (2) Design and develop a drainage mechanism that will protect the coil; (3) Apply for Underwriters laboratories approval and perform follow-up and coordination work to complete task to insure product is safe, within its intended applications; (4) Test invention's performance to demonstrate energy savings and long term resistance to scale and corrosion; (5) Contract with the American Refrigeration Institute to perform engineering tests under controlled laboratory conditions; (6) Organize data, and develop technical manual for helping purchasers determining energy savings and inventions merits, and (7) Perform a field test in a cooperative supermarket, where utility usage can be measured on a before and after basis. Tasks 1,2 are completed; task 3 was abandoned for reasons explained in the last quarterly progress report. Progress on tasks 4 and 5 is reported in this paper. (GHH)

31098 (DTH-LFK-F--122-01) **Adaptive control of a refrigeration system: Feasibility analysis and controller design.** Zhou Jian-jun. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Koeleteknik. Feb 1990. 44p. Contract EM-1223/88-9. Order Number DE92562853. Source: OSTI; NTIS.

EFP-88.

The aim was to develope adaptive control of a refrigeration system for industrial purposes. The proposed control scheme and controller design methods are described. The STAC (Self-Tuning Adaptive Control) method is principally utilized. This is a design procedure where known system parameters are first chosen and then applied to the unknown system in which the unknown parameters are estimated by an online identification method. The refrigeration system and the control objective are described in addition to the basic principles of adaptive control. Commonly used online identification logarithms and the underlying controller design methods are presented. It is concluded that adaptive control techniques are suitable for the refrigeration system in which plant parameters change with time and are not well known. Some suggestions for improving the method are offered. (AB) (30 refs.).

31099 (DTH-LV--87-24) **Measurement and calculations of the solar radiation through glass areas, taking into consideration the objects shadowing the low energy house G in Hjortekaer.** Egelund Thomsen, K.; Schultz, J.M. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Dec 1987. 25p. (In Danish). Contract EM-22411-405-01-01. Order Number DE92562852. Source: OSTI; NTIS.

Covertitel: Maalinger og beregninger af solindfaldet gennem glaspartier under hensyntagen til skyggende genstande for lavenergihus G i Hjortekaer. EFP-84.

The house "G" is a well sealed, highly insulated house with a mechanical ventilation system involving heat recovery which results in a comfortable indoor climate. The recently developed heating system is simple, warm air is blown into the rooms through plinths in relation to fitted cupboards and is sucked out again near the skirting along the outer walls. The architecture of the house is characterized by the outdoor insulating shutters the use of which, in addition to the heat from the sunshine coming in mostly through the windows facing West, results in significant savings in relation to the heating bills. The calculations concerning the solar radiation through the glass areas of the house based on the measured solar intensity, and carried out with the help of a specially developed computer programme, are described in detail. The aim of these measurements was to help determine the energy consumption and the efficiency and yield of the overall heating system, and to help produce a description of the energy balance in the house. The sun shining in through the windows facing West gives free heat, but could result in discomfort due to overheating. In order to reduce overheating, the roof has been extended outwards to give shade. Other outside objects which produce shade have also been taken into account in the computer programme. (AB).

31100 (DTH-LV--87-26) **General computer programme for the calculation of areas of shadow on level surfaces.** Munthe Schultz, J. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Dec 1987. 37p. (In Danish). Contract EM-22411-405-01-01;Contract EM-22411-401-04-01. Order Number DE92562851. Source: OSTI; NTIS.

EFP-84.

Description of a computer programme for calculating the shadow effects (caused by the building itself or from nearby objects outside) on the windows of low energy houses. Shadows on windows effect the heating needs of residential buildings. The validation is explained and an example of the influence of correct shadow calculation on the heating balance in a low energy house is given. (AB).

31101 (DTH-LV--88-16) **Analysis of heat accumulation capacities in relation to residential buildings: Literature study.** Engelund Thomsen, K.; Christensen, J.E. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Aug 1988. 79p. (In Danish). Contract EM-1213-603-02-01;Contract EM-1213/86-2. Order Number DE92562850. Source: OSTI; NTIS.

EFP-86.

The results of a study of relevant literature on the capacity of domestic furnishings and indoor surfaces etc. to accumulate heat. The aim was to produce a basis for reckoning the consequences related to energy and temperature of, under reconstruction, altering a building's "thermal mass". The emphasis is on the capacities of domestic furnishing etc. to store heat, especially heat from the sun, people, electricity and hot water. The theory underlying the American computer programme BLAST, the aim of which is to calculate energy consumption in buildings, is explained. A survey is given of the properties of various building materials where relative data is presented in the form of tables. Convective heat transfer coefficients are given. (AB).

31102 (DTH-LV-MEDD--201) **Optimal design of windows: An investigation of heat technology.** Energiministeriets Forskningsprogram. Energianvendelse i Bygninger. Egelund Thomsen, K.; Schultz, J.M. Danmarks Tekniske Hoejskole, Lyngby (Denmark).

Lab. for Varmeisolering. Dec 1990. 80p. (In Danish, English). Contract EM-22411-401-04-01. Order Number DE92562856. Source: OSTI; NTIS.

EFP-84.

The purpose was to find the best combination of the windows' location in the wall, their size and form, the number of glass layers, type, and mobile night insulation to obtain the lowest possible energy consumption. If windows are moved from the south facade (net heat loss 105 kWh per square meter) to an east or west facade the net heat loss increases by 75 kWh per square meter (70%) in the heating season. Windows should be positioned in continuation of the insulation layer in the surrounding wall, otherwise the net heat loss per square meter window can increase by about 10% during the heating season. If windows can be moved outwards in the wall construction without creating serious thermal bridges around the joint between the window and the wall, the net heat loss will decrease by about 10% due to an increase in solar heat gains. When using insulating shutters each night during the heating season the net heat loss for the window will be negative (-15kWh per square meter). There should be as few windows as possible for reduction of the influence from the thermal bridge effect from the frame and case, eg. the net heat loss per square meter will increase by 65% in the 1.2m x 1.2m window is exchanged with 0.6m x 0.6 m windows. The final design will be a compromise between energy savings, daylighting and architectural considerations. Use of gas-filled and low emissivity coated window panes with low centre U-values will most often be preferable as there is a big reduction of the net heat loss in spite of a decrease in solar heat gains. (AB) (36 refs.).

31103 (DTH-LV-MEDD-202) **Insulating shutters.** Energiministeriets Forskningsprogram. Energianvendelse i Bygninger. Schultz, J.M. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Dec 1990. 82p. (In Danish). Contract EM-1213-501-08-01;Contract EM-1213/85-1. Order Number DE92562855. Source: OSTI; NTIS.

EFP-85.

Relevant literature was studied in order to discover various ways of constructing shutters and to evaluate designs. Analyses on thermal-technical efficiency were made on designs of indoor and outdoor shutters, and shutters between layers of glass. A computer programme was used for calculating two-dimensional steady-state fields suitable for determining the importance of thermo-technical efficiency of edge effects and cold bridges. An examination was made of the location of shutters in relation to wall thickness and of efficiency at different combinations of shutters and window panes. The question of heightened risk of condensation on window panes was studied in detail by calculating the two-dimensional temperature field in the construction after opening the shutters. A programme was made for calculating air flow in a light ventilated cavity where the flow is caused by temperature differences in order to evaluate the importance of a not-too-tight connection between shutter and window/wall construction. It is concluded that possible energy saving by daily use of shutters during the heating season would be about 100 kWh per square meter by optimum location of shutters. Indoor shutters, and those beween layers of glass, make little difference to energy saving capacity. It would be simple to make shutters of wooden frames filled with insulating material and plywood surfacing, these could be economically profitable within 5 years. (AB) (15 refs.).

31104 (DTH-LV-MEDD-225) **The influence of heat bridges on heat losses in buildings.** Energiministeriets Forskningsprogram. Energianvendelse i Bygninger. Engelund Thomsen, K. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Nov 1991. 57p. (In Danish). Contract EM-1213-501-09-01;Contract EM-1213/85-1. Order Number DE92562857. Source: OSTI; NTIS.

EFP-85.

The aim was to analyse frequently appearing cold bridges in buildings with regard to surface temperatures and heat loss. A computer programme for calculating two-dimensional heat flows was used. A large number of different foundations and slab-on-ground constructions were studied with regard to designs both with and without cold bridges. In foundations the effect of cold bridges can be traced about 2 meters from the outer wall regardless of what type of outer wall is chosen. The effect of the cold bridge can be traced about 0.5 m up in a brick wall, and 1.5 m up in a concrete wall. An efficient method of breaking the cold bridge is to use lightweight concrete blocks in the foundation and the first break is the most important. When using two courses of lightweight blocks (ht 0.4m) compared to an ordinary concrete foundation about 11% of the total heat loss through the floor will be saved, while 13% can be saved by using 4 courses of lightweight blocks. Outer corners can be considered as cold bridges when compared to a straight wall of the same length as measured along the inner side of the corner. Calculations have been made of 3 different wall designs, and the heat flows and the inner surfaces are shown. In a concrete wall the effect of the cold bridge can be seen about 0.6 - 0.7m along the wall but when using a better insulated wall the effect can only be traced about 0.4m along the wall. A cold bridge will appear where the window is mounted in the wall. The effect of how and where the window is placed in the wall has been studied in addition to the extra heat loss caused by the cold bridges. (AB) (11 refs.).

31105 (DTH-LV-MEDD-226) **Efficient domestic hot water heating.** Energiministeriets Forskningsprogram. Energianvendelse i Bygninger. Schultz, J.M. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Dec 1991. 70p. (In Danish). Contract EM-1213-602-07-01;Contract EM-1213/86-2. Order Number DE92562858. Source: OSTI; NTIS.

EFP-86.

The aim was to investigate alternative, electrically or gas/oil heated, domestic hot water systems to find potentials for minimum heat loss from pipes and hot water tanks. Experiments were carried out on a 10 l electrically heated hot water heater and a 21 kW electric instant water heater. Tapping experiments measured stand-by losses and resulting hot water temperatures at various flow rates, and a 60 l gas-boiler heated water tank was examined. Based on a 24 hour water tapping pattern, simulations were performed in order to optimize systems with a central storage tank of with smaller decentralized water heaters. Analyses were made of distribution losses showing the dependence on pipe length and water circulation. It was shown that highest energy efficiency is attained with decentralized electric instant heaters, giving energy savings of approx. 2050 kWh p.a. The optimal solution for a centralized system is an 8 kW high efficiency boiler with a 60 l hot water tank. Energy savings are ca. 1000 kWh p.a. If there is no circulation of hot water, distribution losses from the pipes are ca. 3.0 Wh/mK daily. Simultaneous use of kitchen tap and bathroom shower leads to a min. rating of 36 kW for instantaneous heaters. Water-saving shower heads could reduce the demand. Electric water heating is expensive for the user, owing to Danish energy pricing policy. The cheapest solution is a small gas boiler (8kW) and a 60 l water tank. Reduction in boiler heat losses and investment in water saving devices for fixtures in a house will give a significant reduction in the energy cost of domestic hot water heating. (AB) (14 refs.).

31106 (DTH-LV-MEDD-229) **Analysis of heat accumulation capacities in relation to residential buildings.** Energiministeriets Forskningsprogram. Energianvendelse i Bygninger. Petersen, E. (Dansk Teknologisk Institut, Energiteknologi (DK)); Engelund Thomsen, K. Dansk Teknologisk Inst., Taastrup (Denmark). Energiteknologi; Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering. Feb 1992. 88p. (In Danish). Contract EM-1213-603-02-01;Contract EM-1213/86-3. Order Number DE92562854. Source: OSTI; NTIS.

EFP-86.

The ability of a room to accumulate heat input influences the usability of heat gains. The thermal mass is very important as a stabilizer of room temperatures at fluctuating heat input, because of solar heat gains. Computer analyses have been carried out to compare two geometrically identical rooms, one with gypsum boards on timber frames and the other containing 0.10m of concrete. The heat demand increases with increasing window area in both rooms as the ratio of usable solar heat gains decreases because the room temperatures become too high. To obtain a heating demand reduction at increasing window area, the U-value of the window must be improved. The thermal mass of furniture is of no importancce in the high mass room, but may lower the total heat capacity of the room by shading or insulating the thermal mass. In the case of a room with internal heat gains from persons, lighting and appliances, the heating demand is reduced and differences between the high and the low mass room increase. Calculations showed that one heavy surface (eg. a concrete floor or ceiling) has a large effect. Window orientation has a strong influence on heating demand. It is important to design rooms with sufficient thermal mass in order to accumulate solar heat gains during the daytime for later use without suffering unacceptable high temperatures, and to cut off the top of overheating so that it is not necessary to introduce shading measures that eliminate a major part of heat gains during the heating season. (AB) (38 refs.).

31107 (KTM/E-B--108) **LVIS-2000 and ETRR Future building services and energy-efficient buildings and building components: Evaluation of the research programmes 1988-1990.** Abel, E. (Chalmers University of Technology, Gothenburg (Sweden). Installationsteknik); Jensen, O.; Nyberg, B.R.; Rechardt, T.; Saxhof, B. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1991. 53p. Order Number DE92562894. Source: OSTI; NTIS.

Finland's energy research programmes.

In October 1991 an international expert group, appointed by the Energy Department of Ministry of Trade and Industry (MTI) evaluated the LVIS-2000 and ETRR research programmes and their sub-projects. The evaluation was based on two interim reports and selected papers in English sent to the committee members and finally the presentations made to the committee during the visit in 1st to 4th October. Different aspects of the programmes and their sub-programmes have been evaluated: the goals and objectives, resources, expediency of results, scientific standard and dissemination of results. An important factor was also the participation in IEA and other international research activities. The committee considered the research programmes and their realization meet in general a high international standard. The quality and quantity of research reports are in good agreement with the spended resources and the expediency of results is also good for the new energy saving solutions in the building practice. Concerning the dissemination of results, in addition to the scientific papers a lot of work has been done to inform building industry and general public about the programmes and specific projects. The participation of several sub-profects to the respentive IEA research programmes was considered very valuable. Also the publishing and international dissemination of the research reports and papers in English is of high importance and should be even more effective. The main general recommendation for the future is to merge the two main research areas into one research programme dealing with the building and its systems as a unity.

31108 (LUTMDN-TMVK--5211-1-39-92) **'Soft' electric heating. Control of resistance heating radiators.** Andersson, T. Lund Inst. of Tech. (Sweden). Div. of Heat and Power Engineering. 1992. 37p. (In Swedish). Project BFR-870473-7. Order Number DE92563033. Source: OSTI; NTIS.

Examination paper.

The possibility of reducing the heating effect demand, by using microprocessor based control systems for resistance heating, is studied. Most of the study treats experimental measurements. A comparison is made between this 'soft' electricity system and conventional room thermostats. The heating effect demand can be reduced by 25-45%, with this new system.

31109 (LUTMDN-TMVK--7007-1-106-91) **Reheating of flue gas in small gas-fired condensing boilers.** Naeslund, M. Lund Univ. (Sweden). Dept. of Heat and Power Engineering. 1991. 106p. (In Swedish). Order Number DE92563052. Source: OSTI; NTIS.

A deliberate lowering of the flue gas temperature from a boiler or furnace below the water vapour dew point makes possible utilisation of the latent heat for useful purposes. Such condensation technique is well suited for gas fired boilers and is commercially available, also for single family houses. The use of flue gas condensation requires attention to material choice in certain parts of the boiler, heat exchanger design, burner design, condensate chemistry etc. This study focuses on the problem of condensate formation in the chimney and a method of avoiding it. The method adopted depends on the flue gases being reheated after the condensation in the boiler. By this, flue gases are guaranteed to have a temperature and humidity which does not cause any remaining condensate in the chimney, so it is possible to have a chimney without a corrosion resistant lining. In this report the necessary reheating is determined both theoretically and from laboratory tests. Also treated is the influence of reheating on the boiler characteristics, considering the interaction between the parts of the building and the heating system such as the energy and heat demand, the heating system design, the chimney dimensions, and the burner input. A model for the calculation of the temperatures in the chimney has been developed for this purpose. Different boiler designs suitable for flue gas reheating have also been studied. The investigation show that a suitable degree of reheating of 30-75 deg C and dilution of the flue gases to an equivalent excess air ratio of 150-200% only lowers the annual average boiler efficiency slightly. The ambient part of the chimney should be fitted with a thin insulation layer to avoid condensate formation at any point in the chimney. 33 refs., 52 figs., 6 tabs.

31110 (NEI-DK--912) **Labelling electrical household appliances to show their consumption of electicity: Joint Nordic proposal.** Nordic Council of Ministers. NORDNORM Commission. Apr 1991 61p. Order Number DE92562865. Source: OSTI; NTIS.

Also published in Danish.

The NORDNORM Commission recommends that an energy labelling scheme be implemented which, by affecting the consumer's choice of electrical household appliances, should induce manufacturers to produce appliances that are more energy efficient. The aim is thus to reduce electricity consumption and contribute to the protection of the environment. The report deals with the work of the Commission on energy labelling, coordination with the EC proposal, label design, updating, financing, product information and coordination at the Nordic level. It was decided to initially base the design of the labels on the guidelines developed by Leiden University (the Netherlands). Labels should enable comparison with the annual energy consumption of other electric appliances. They should also indicate the level of agreed efficiency standards. It is also suggested that a balance should be sought between costs and update frequency. The organization of the energy labelling scheme should involve cooperation with industry, and the costs of operation should be financed by user payment. Minimum standards should be set for supplementary information to be issued in a standardized form in brochures, etc. (AB).

31111 (NEI-DK--913) **Labelling electrical household appliances to show their consumption of electricity: Appendix to the Joint Nordic proposal.** Nordic Council of Ministers. NORDNORM Commission. Jan 1991 15p. Order Number DE92562866. Source: OSTI; NTIS.

Also published in Danish.

The NORDNORM commission recommends that an energy labelling scheme be implemented which, by affecting the consumer's choice of electrical household appliances, should induce manufacturers to produce appliances that are more energy-efficient. The aim is that this should lead to a reduction in electricity consumption and thus contribute to the protection of the environment. Compulsory labelling of refrigerators of all kinds, washing machines, dishwashers, tumble driers, electric ovens and electric water heaters, with others to follow, is advised. Labelling, supplied by manufacturers, must be clear and comparative. The scheme should be implemented nationally but coordinated on a Nordic basis. The possible design of such a label is discussed in addition to the deliberations of the Commission and the implementation of a framework for legislation. (AB).

31112 (NEI-DK--914) **Principles for efficiency standards for the electricity consumption of household appliances: Joint Nordic Proposal.** Nordic Council of Ministers. NORDNORM Commission. Jan 1992 89p. (In Danish). Order Number DE92562867. Source: OSTI; NTIS.

The principles underlying the NORDNORM Commission's proposal for labelling domestic electrical appliances in order to inform the public on their energy efficiency are presented in detail. This practise should lead to reduced electricity consumption and thus should contribute to the protection of the environment. The deliberations of the Commission are also described in detail. (AB).

31113 (NEI-FI–171) **The utilization of building maintenance feedback in Hepac-design.** Yrjoelae, J. (Projekti-Insinoeoerit Oy, Vantaa (Finland)); Sainio, E.O.; Heikkinen, L.; Saarimaa, J. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1987. 88p. (In Finnish). Order Number DE92562902. Source: OSTI; NTIS.

The objective of the study is to improve Hepac-design so that the information feedback of building maintenance would benefit more the building design. The information has been collected from interviews and literature. The interviewed persons were employers, operation and maintenance personnel, equipment manufacturers, Hepac-service companies. contractors and Hepac-designers. Maintenance, Hepac-design and interviews is discussed first. It is followed by a presentation how to use in Hepac- and maintenance design and in operation the information provided from literature and interviews. Finally the interaction between building maintenance and Hepac-design is presented.

31114 (NEI-FI–173) **Remote supervision systems in communes.** Sulku, J. (Ekono Oy, Espoo (Finland)); Erkioe, E. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1987. 112p. (In Finnish). Order Number DE92562904. Source: OSTI; NTIS.

Suomen Kaupunkiliiton julkaisu nro 399, Suomen Kunnallisliiton tekninen julkaisusarja nro 58.

Most bigger communes have a remote system either for supervision and management of buildings or waterworks. The system scales vary from small systems capable to transmit only common alarms, to large distributed direct digital control systems. Most systems are, however, relatively simple with only a few measurement or control points. The economical effects of remote supervision systems are emphasized on saving of amount of off-hour work. Also communes using remote supervision have less maintenance personnel per cubicmeter than communes not using it. The energy saving effects could not been verified by experience.

31115 (NREL/TP–441-4824) **Identification of building applications for a variable-conductance insulation.** Potter, T.F. (National Renewable Energy Lab., Golden, CO (United States)); Tuluca, A. National Renewable Energy Lab., Golden, CO (United States). Jul 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. (CONF-920828–9: American Council for an Energy-Efficient Economy summer study on energy efficiency in buildings, Pacific Grove, CA (United States), 30 Aug - 5 sep 1992). Order Number DE92016401. Source: OSTI; NTIS; GPO Dep.

Recent experiments have confirmed the feasibility of controllable, reversible disabling of a vacuum insulation panel, which may result in the development of energy-efficient building envelope components. These components could extend the managed energy exchange through the building envelope from about 30% (typical with fenestration systems in commercial buildings), to as much as 90% of the gross wall and roof areas. Further investigation will be required to optimized the thermal response and the magnitude of the R-value swing (from a difference between insulating and conducting insulating values of 4 to as high as a factor of 100). The potential for energy reduction by using the variable-conductance insulation in the building envelope is discussed, and other potential building applications are mentioned.

31116 (OY/TEK-EL–10) **Technical prevention of cold environments.** Luttu, J.; Vilppunen, J. Oulu Univ. (Finland). Energy Lab. Aug 1990. 41p. (In Finnish). Order Number DE92562907. Source: OSTI; NTIS.

As a cold environment is considered any environment where the human skin temperature goes locally or on the average below the comfort temperature. The recommended values of Finnish ventilation norm committee, building norm of SBN 75 and subjective temperature has been compared in different levels of physical activity. In technical prevention of cold problems in the working environment the thermal condition, the work and clothing are taken in account. Before the final prevention the effects of the proceeding actions must be known to the final results. The needed prestudies are for instance proper thermal resistance of clothing, physical activity, work descriptions with working movements and areas and the changes of thermal conditions in respect of thermal comfort. Outdoors, the prevention of the cold problems should be weighted mainly to the developement of thermal resistance and shelter effect of clothing besides the technical prevention. Exapmles of the criteries of product development and product testing are listed for technical prevention of cold problems with bases of evaluation.

31117 (PNL-SA–20969) **An integrated environment for intelligent energy design.** Brambley, M.R. (Pacific Northwest Lab., Richland, WA (United States)); Quadrel, R.W.; Stratton, R.C.; Brown, G.Z.; Meacham, M.; Miller, P.; Pohl, J.G.; La Porta, J.; Snyder, J.; Selkowitz, S.E.; Papamichael, K.; Bailey, M.L. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206230–1: Symposium on building systems automation integration, Dallas, TX (United States), 10-12 Jun 1992). Order Number DE92019083. Source: OSTI; NTIS; GPO Dep.

The design of energy-efficient buildings can be aided by intelligent computer tools that can evaluate design solutions and make recommendations for improving the buildings' energy performance. Such tools can be very productive when they are integrated with existing computer-aided design technology. Pacific Northwest Laboratory, in collaboration with the University of Oregon, the California Polytechnic State University, and the Lawrence Berkeley Laboratory, is developing such tools and integrating them into a computational environment that can be easily used by architects, engineers, and designers. This project, called the Advanced Energy Design and Operations Technologies (AEDOT) project, intends to demonstrate how building energy performance can be improved by combining expertise from a variety of domain perspectives during the design process. This paper describes the first prototype to emerge from the AEDOT work. AEDOT Prototype 1 consists of several design and energy tools that have been integrated using, the ICADS framework developed at California Polytechnic State University. The prototype demonstrates how an integrated system responds to a building design as it is being developed on a CAD system. While the designer draws a building floor plan, a number of intelligent design tools (IDTs) examine the drawing and evaluate the design's acoustics, thermal profile, daylighting use, cost, and compliance with energy standards, to name a few. These IDTs also make design-specific recommendations intended to improve the cost, energy performance, and overall quality of the design.

31118 (SSY-JULK–1/92) **Residential electricity consumption.** Haapakoski, M.; Rouhiainen, V.; Savolainen, T. Association of Finnish Electric Utilities, Helsinki (Finland). 1992. 90p. (In Finnish). Order Number DE92562899. Source: OSTI; NTIS.

Residential electricity consumption as obtained from utilities' electricity balance sheets was decomposed into its main components: agriculture, holiday residences, buildings, heating electricity, and household electricity, on the basis of updated information on the number of dwellings, appliances, and unit consumptions. Lately especially the saturation of dishwashers, microwave ovens, and dryers has increased and so has the number of secc [illegible] electrical heating equipment. Household electricity in 1990 was estimated to be 6700 GWh with an average increase of 3 % during the 1980's. The detailed measurements of the total electricity consumption and four to seven of its components in fifty households gave new information on the usage patterns of appliances and their electricity consumption. In the measured sample the average yearly consumption was approximately 7800 kWh in single family houses and 2500 kWh in apartments. Both averages exceed the respective population averages the differences resulting from the measured sample being highly equipped.

3202 Transportation

Refer also to citation(s) 31125, 31151, 31152, 31155, 31161, 31162, 31163, 31164, 31165, 31166, 31167, 31168, 31169, 31170, 31171, 31172, 31173, 31174, 31175, 31176, 31177, 31178, 31179, 31180, 31181, 31182, 31183, 31184, 31185, 31187, 31407

31119 (CONF-9209176–1) **Simulation and intelligent vehicle highway systems.** Rathi, A.K. (Oak Ridge National Lab., TN (United States)); Santiago, A.J. Oak Ridge National Lab., TN (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States); Federal Highway Administration, Washington, DC (United States). DOE Contract AC05-84OR21400. From 3. international conference on vehicle navigation and information systems; Oslo (Norway); 2-4 Sep 1992. Order Number DE92019943. Source: OSTI; NTIS; GPO Dep.

Intelligent Vehicle Highway Systems (IVHS) is based on the premise of using advanced technologies in telecommunication, electronics, and computers to improve the nature and quality of highway travel while making it safer and more efficient. The safety benefits of the IVHS systems are unquestioned; however, there are different levels of optimism about the operational benefits of these systems. While there is a broad consensus that IVHS can improve the flow of traffic, and thus mobility, currently there is very limited empirical evidence or analytical basis to support this optimism. The lack of analytical framework for design, analysis, and evaluation of IVHS concepts will continue to fuel the debate between the skeptics and the advocates of IVHS. Computer simulation is likely to play a major role in the analysis and assessment of the IVHS technologies. In this paper, we attempt to identify the simulation modelling needs to support the IVHS functional areas dealing with traffic flow on highway networks. The paper outlines the envisioned IVHS operational environment. Functional requirements for the simulation modelling system that could be used to support the development and testing of IVHS concepts, namely Advanced Traffic Management Systems (ATMS) and Advanced Traveller Information Systems (ATIS), are defined. Simulation modelling research and development needs to support the design and evaluations of IVHS concepts are described. The paper concludes by presenting ongoing work on the traffic simulation models at the Oak Ridge National Laboratory.

31120 (NEI-DK--905) **LASTCOMP - electronic data processing for transportation by lorries: Final report.** Krarup (N.), Copenhagen (Denmark); Cowiconsult Raadgivende Ingenioerer A/S, Virum (Denmark); Dansk Teknologisk Inst., Skovlunde (Denmark). Emballage- og Transportinstituttet. Jun 1992 10p. (In Danish). Contract ENS-1243/90-0002. Order Number DE92562875. Source: OSTI; NTIS.

EFP-90.

The aim of the project was to establish a framework for various kinds of information for authorities, firms and chauffeurs related to transportation by lorries. These groups can contribute to the reduction of energy consumption and pollution abatement in this respect and access to a systemized form of information should be economically advantageous for haulage contractors and practical for drivers. A user-friendly Danish system for mobile communication via satellite and computer systems including software for use in the office and in the lorries was developed and marketed. Haulage firms and firms specializing in communication worked together on this project and it is expected that commercial success will follow. (AB).

31121 (NEI-DK--906) **Analysis of advantages to be gained by users through utilizing SAFECOM CL computers in lorries.** Energiministeriets forskningsprogram. Energianvendelse i transportsektoren. Krarup (N.), Copenhagen (Denmark); Cowiconsult Raadgivende Ingenioerer A/S, Virum (Denmark); Dansk Teknologisk Inst., Skovlunde (Denmark). Emballage- og Transportinstituttet. Dec 1991 41p. (In Danish). Contract ENS-1243/90-0002. Order Number DE92562877. Source: OSTI; NTIS.

EFP-90.

The SAFECOM CL product, which is a computerized information system especially developed for the use of haulage contractors and lorry drivers, enables continuous communication, and access to data, between contractors' offices and drivers. It is expected that the system will be tested and marketed during 1992. To ensure a targeted development and marketing, the described project was initiated in order to investigate who would be the users of the system and to what uses it could be put. One of the overall reasons for using the system is to achieve energy and also money savings in relation to road haulage. It was wished to discover in which types of situation the computerized communication system would be used. Three lorry drivers were chosen to give their evaluations of the system, the three chosen firms were of varying types. The functions of the communication systems are explained and types of information exchanged, positioning of vehicles, route changes, monitoring of vehicles, cargo management and many other detailed aspects of road haulage activities are investigated and explained in relation to the advantages of using the computerized communication and information system. (AB).

31122 (NEI-DK--907) **LASTCOMP - electronic data processing for transportation by lorries.** Krarup (N.), Copenhagen (Denmark); Cowiconsult Raadgivende Ingenioerer A/S, Virum (Denmark); Dansk Teknologisk Inst., Skovlunde (Denmark). Emballage- og Transportinstituttet. Jun 1992 25p. (In Danish). Contract ENS-1243/90-0002. Order Number DE92562876. Source: OSTI; NTIS.

EFP-90.

A short description of the way the project has run and the results achieved is presented. The described project concerns the development of a computerized information system, for use by haulage contractors, firms and drivers, which enables direct communication to and from the lorries and the involved offices, and should eventually lead to fleet management. The system consists of a number of work stations located at the haulage contractor offices. Via these computers communication can be established with the lorry drivers and current information direct from the lorry drivers can be used to build up a survey of the actual situation. Computers with touchscreen keyboards are situated in the lorries. The lorry drivers can choose between standard menues, standard forms of information etc. and can also write texts. Attached to the mobile computer is a GPS antenna which can continuously register the position of the vehicle, and also satellite communication equipment which ensures communication between the mobile unit and the central station. The system can only be used by registering a special card showing personal data. The design and uses of this system are described in further detail, and data showing resulting energy savings enabled by the use of the information system are given. (AB).

3203 Industrial and Agricultural Processes

Refer also to citation(s) 30794, 31062, 31064, 31075, 31095, 31096, 31097, 31386, 31630

31123 (AAA-REP--89-2) **Optimization of the heat recovery system of a paper machine.** Gustafsson, S.; Henriksson, G.; Saxen, H. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1989. 13p. Order Number DE92562973. Source: OSTI; NTIS.

Design of heat recovery systems for paper machines is studied by means of a sequential modular flowsheeting program. The program is used for economical optimization of the heat recovery system with respect to its design variables. In the optimization, the flowsheeting program supplies information to an approximate model, which is repeatedly updated and optimized. Objective function values corresponding to sets of design variables, obtained in factorial experiments, are used to determine the parameters of the approximate model. Analyses predict that steam savings of 25 % can be obtained if the heat recovery systems which are designed by the use of current standard practice are replaced by the optimized systems. For a typical newsprint machine, this implies an increase in the yearly venture profit of about US dollar 30000.

31124 (CONF-921104--2) **A new apparatus for continuous countercurrent flow of solids and liquids.** Haas, P.A. Oak Ridge National Lab., TN (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From American Institute of Chemical Engineers annual meeting; Miami, FL (United States); 1-6 Nov 1992. Order Number DE92011675. Source: OSTI; NTIS; GPO Dep.

A contactor was developed to provide true countercurrent, continuous flow of gel spheres and liquid in a moving bed. To provide smooth and controlled movement of solids, the key features consisted of a common cross section for the moving bed and a small fluidized bed, a jet to give a slurry at the bottom of the moving bed, and a controlled flow of part of this slurry to the fluidized bed. A completely continuous pilot plant for preparation of nuclear fuel by a gel-sphere process was operated with three of these moving-bed fluidized-bed contactors. Different control procedures and good countercurrent washing results were demonstrated.

31125 (DOE/CE/15440--T5) **Microtube strip heat exchanger: Final technical report.** Doty, F.D. Doty Scientific, Inc., Columbia, SC (United States). 9 Jul 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-90CE15440. Order Number DE92018709. Source: OSTI; NTIS; GPO Dep.

The purpose of this contract has been to explore the limits of miniaturization of heat exchangers with the goals of (1) improving the theoretical understanding of laminar heat exchangers, (2) evaluating various manufacturing difficulties, and (3) identifying major applications for the technology. A low-cost, ultra-compact heat exchanger could have an enormous impact on industry in the areas of cryocoolers and energy conversion. Compact cryocoolers based on the reverse Brayton cycle (RBC) would become practical with the availability of compact heat exchangers. Many experts believe that hardware advances in personal computer technology will rapidly slow down in four to six years unless lowcost, portable cryocoolers suitable for the desktop supercomputer can be developed. Compact refrigeration systems would permit dramatic advances in high-performance computer work stations with "conventional" microprocessors operating at 150 K, and especially with low-cost cryocoolers below 77 K. NASA has also expressed strong interest in our MTS exchanger for space-based RBC cryocoolers for sensor cooling. We have demonstrated feasibility of higher specific conductance by a factor of five than any other work in high-temperature gas-to-gas exchangers. These laminar-flow, microtube exchangers exhibit extremely low pressure drop compared to alternative compact designs under similar conditions because of their much shorter flow length and larger total flow area for lower flow velocities. The design appears to be amenable to mass production techniques, but considerable process development remains. The reduction in materials usage and the improved heat exchanger performance promise to be of enormous significance in advanced engine designs and in cryogenics.

31126 (DOE/CE–92019969) **Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Management Plan.** USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Office of Industrial Processes. May 1989. 22p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019969. Source: OSTI; NTIS; GPO Dep.

This Act has the following purposes: to increase the energy efficiency and enhance the competitiveness of American steel, aluminum, and copper industries, and to continue steel R and D efforts begun under DOE's Steel Initiative. This Management Plan is to generally define the roles and responsibilities of the organizations involved in implementing the Act - including the Federal Government, the national laboratories, industry, and universities. Other objectives are to provide information on non-Federal cost sharing and to identify organizational and administrative procedures involved. (DLC)

31127 (DOE/CE–92019970) **Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Research Plan.** USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Office of Industrial Programs. May 1989. 66p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019970. Source: OSTI; NTIS; GPO Dep.

The Act directs the Secretary of Energy to reestablish an industrial energy conservation and competitive technology program to conduct scientific research and development of steel and aluminum technologies to carry out the purposes of this Act, to publish an update of the management plan published separately and to publish an update of the research plan. The term research plan means the Steel Initiative Research Plan issued in April 1988 by the Department of Energy. To develop the updated Research Plan, the April 1988 Plan has been modified to reflect the intent of Congress as indicated in the Act and committee reports; aluminum and copper have been included and information has been added in the steel area. The updated Plan thus identifies and establishes priorities for research and development opportunities that can increase the energy efficiency and enhance the competitiveness of American steel, aluminum and copper industries. In formulating the Research Plan all major process areas where preliminary analysis suggests there is an opportunity to increase energy efficiency and enhance competitiveness have been analyzed. In addition, other areas suggested by the 1988 Act have been considered in consultation with industry.

31128 (DOE/CH/10093–135) **Industrial Innovations for tomorrow: Advances in industrial energy-efficiency technologies: Degradable plastic made from potato peels.** National Renewable Energy Lab., Golden, CO (United States); Energetics, Inc., Columbia, MD (United States). Jul 1992. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE92001227. Source: OSTI; NTIS; GPO Dep.

Stimulated by public demand and state and federal legislation, industry has begun to develop bio- and photo- degradable plastics. so far, however, none of these degradable plastics meets all of the criteria for success - adequate physical and mechanical properties for the desired use, cost-effectiveness, and 100% degradability. Polylactic acid (PLA) plastic is one degradable plastic that shows promise. It has the desired properties and is 100% degradable. However, PLA plastic made by conventional techniques is not cost effective. Made from lactic acid, which is typically made form petroleum using a very costly synthesis process. Lactic acid can also be made from carbohydrates (starches), found in food processing wastes such as potato wastes, cheese whey, and sorghum. Conversion of starch to simple sugars, and fermentation of these sugars can produce lactic acid.

31129 (EGG-M–92026) **Two-phase flow modeling with discrete particles.** Mortensen, G.A. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Trapp, J.A. EG and G Idaho, Inc., Idaho Falls, ID (United States). 23 Mar 1992. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-921110–10: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92017850. Source: OSTI; NTIS; GPO Dep.

The design of efficient heat exchangers in which the working fluid changes phase requires accurate modeling of two-phase fluid flow. The local Navier-Stokes equations form the basic continuum equations for this flow situation. However, the local instantaneous model using these equations is intractable for all but the simplest problems. All the practical models for two-phase flow analysis are based on equations that have been averaged over control volumes. These models average out the detailed description within the control volumes and rely on flow regime maps to determine the distribution of the two phases within a control volume. Flow regime maps depend on steady state models and probably are not correct for dynamic models. Numerical simulations of the averaged two-phase flow models are usually performed using a two-fluid Eulerian description for the two phases. Eulerian descriptions have the advantage of having simple boundary conditions, but the disadvantage of introducing numerical diffusion, i.e., sharp interfaces are not maintained as the flow develops, but are diffused. Lagrangian descriptions have the advantage of being able to track sharp interfaces without diffusion, but they have the disadvantage of requiring more complicated boundary conditions. This paper describes a numerical scheme and attendant computer program, DISCON2, for the calculation of two-phase flows that does not require the use of flow regime maps. This model is intermediate between the intractable local instantaneous and the averaged two-fluid model. This new model uses a combination of an Eulerian and a Lagrangian representation of the two phases. The dispersed particles (bubbles or drops) are modeled individually using a large representative number of particles, each with their own Lagrangian description. The continuous phases (liquid or gas) use an Eulerian description.

31130 (IEE–SR-233) **Trend in energy demand in factory air conditioning.: Analysis by a questionnaire of actual situation of air conditioning for cooling.** Institute of Energy Economics, Tokyo (Japan). 20 Jan 1992. 121p. (In Japanese). Order Number DE92562529. Source: OSTI; NTIS.

Among factory energy consumptions such as heating for production, illumination and air cooling and heating, the actual situation of energy consumption for air cooling, in particular, is clarified by a survey using a questionnaire. Factory air conditioning is featured by process air conditioning for products and working space air conditioning for workers. Diffusion index of air cooling by factory section is high in office and research laboratory sections and low in stations, especially in production processes. Air cooling in production process by business type shows a high diffusion index in electric machinery, precision machinery, chemical industry and food, and does a low diffusion index in processing and assembly type general/transportation machinery and metal products and raw material type iron steel/nonferrous metal industries. In case of applying refrigerator capacity obtained from samples in the questionnaire to a nation size, it is found that electric refrigerator capacity becomes about 10 million kw. As for the factory air cooling in the hearing survey, there are an entire one and a spot one, which aim at production management and improvement of the operational environment. Increase of cooling equipment depends largely on the economic situation, and the recent economic trend shows a dim outlook. 77 figs., 33 tabs.

31131 (KCP–613–4801) **Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report.** Gerding, M.J. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019638. Source: OSTI; NTIS; GPO Dep.

A process waste assessment (PWA) is a systematic, planned procedure with the overall objective of identifying opportunities and methods to reduce or eliminate waste. A PWA also provides emission and waste stream information for regulatory reporting requirements. This specific PWA examines waste minimization and emission information for the process of encapsulating electronic assemblies with monomeric TDI polyurethane foam, using an automated foam encapsulation machine for mixing.

31132 (KCP–613–4809) **Radar operations process waste assessment: Solder pot tinning.** Riehle, T.J. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 68p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019470. Source: OSTI; NTIS; GPO Dep.

This report discusses the pilot process waste assessment (PWA) performed on solder pot tinning in the Miniature Radar Assembly department. It addresses the work performed, assumptions made, and the waste minimization options generated. With these options, the expected cost and expected performance are given. A section is included that contains suggestions for items that need to be looked at the next time this PWA is performed. The last part of this report contains copies of the worksheets used to complete this assessment.

31133 (LA-UR–92-2183) **New technologies for refrigeration without CFCs.** Swift, G.W. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209164–2: New Mexico conference on the environment: toward a sustainable environment, Albuquerque, NM (United States), 13-15 Sep 1992). Order Number DE92018886. Source: OSTI; NTIS; GPO Dep.

Today the appliance industry and other cooling industries are facing the double challenge of eliminating environmentally harmful CFCs while simultaneously improving energy efficiency. These challenges will force this industry to make tremendous changes and to work out many difficult problems, ranging from choice of technology through production-line retooling to product-liability concerns. Three new cooling technologies–sonic compression, thermoacoustic refrigeration, and Malone refrigeration–have been developed at least in part at Los Alamos National Laboratory. We will discuss the principles, features, and status of each of these three technologies. With these three examples we hope to show that mechanical compression and subsequent evaporation of CFCs is not the only potentially practical way to produce cooling. These examples are only three of many alternative cooling technologies. No new technology can be guaranteed a success before development is complete, from either an economic or engineering point of view. But enough alternative cooling technologies exist, and the probability for success of each technology is high enough, that one or more of these technologies can almost certainly be produced at reasonable cost, eliminate CFCS, and reduce the consumption of electricity.

31134 (LUTKDH-TKKA–7005-1-35-91) **Modelling of intraweb heat and mass transfer - a literature review.** Nilsson, Lars. Lund Univ. (Sweden). Dept. of Chemical Engineering. Sep 1991. 40p. Order Number DE92563096. Source: OSTI; NTIS.

The literature was surveyed for papers dealing with simulation models for paper drying. Interest was focused on intraweb heat and mass transfer. The literature was further surveyed for experimental drying data and for experimental investigations of the heat conductivity and water vapour diffusivity of paper. 33 refs., 15 figs.

31135 (LUTMDN-TMKT–5133-1-68-92) **Heat insulated tube system for dairying environment.** Larsson, B.; Lorentzon, U. Lund Univ. (Sweden). Dept. of Machine Design. 1992. 143p. Order Number DE92563053. Source: OSTI; NTIS.

Examination paper.

The task was to find a way to insulate tubes that are used in dairying environment. Since the hygienic demands are high the insulation is not allowed to absorb liquids or generate dust. When all criteria were specified, as demands and requirements, the search began for usable insulation materials and application methods. The materials and the application methods were combined to give a lot of different drafts that would fulfil the demands for the insulation. After the preliminary cut outs the remaining drafts have been carefully examined and evaluated. Two drafts were worth further development. They were a massive elastomeric and a double tube with enclosed air. In order to find the final solution some effect and temperature calculations for these drafts were made. To complete and verify our calculations six tests were made. The tests were: * uninsulated tube, * insulated tube with round outer cover, and * insulated tube with quadrangular outer cover. Each case was tested in both vertical and horizontal position. The test result showed that the calculation model gives a very good approximation to the reality. One demand in the specification of the master thesis was that the increasing of the cost not is allowed to be larger than the increasing of the value, i e the total cost for the machine is not allowed to increase. This is probably not fulfilled. However, if the operational costs is included in the estimation, the total cost for the machine during its lifetime will decrease. (Numerous tables and diagrams).

31136 (NEI-FI–170) **Energy savings with combination dryer.** Jokioinen, I. (Valmet Paperikoneet Oy Pansion tehdas, Turku (Finland)); Solin, R. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1991. 46p. (In Finnish). Project KTM-176/881/87. Order Number DE92562901. Source: OSTI; NTIS.

RAINA-research programme.

The goal of this project was to join a gasfired IR-dryer and a gasfired air dryer together to a gasfired combination dryer with good energy economy, runnabilty and flexibility. In this report ON- and OFF-machine coater layouts have been simulated with different dryer alternatives. The energy efficiency of the different alternatives varied between 36-61 % of the input energy (ON-machine alternative). The smallest energy consumption and the best energy efficiency is reached when the dryers (IR/air dryer) are gas or steam heated (air dryer). The energy efficiency is improved if the dryers (IR/air dryer) are integrated into combination dryers. The combination dryers improve the working environment by reducing the heat- and waterload into the machine hall. According to made measurements and simulations, 20 % less of the input energy went into the machine room as heat load, and 20 % less of the water evaporated by the IR and airfoil sections went into the machine room as water load, compared to separately placed IR and airfoil units. The combination dryer also reduces the need for required space for the coater in the machine room. According to the results of this project the energy costs for new coated paper dryer equipment installed in Finland during a year would be 10-15 MFIM/a less if 50 % of the electrical IR-dryers were gas-IR-combination dryers instead.

31137 (NEI-FI–172) **The analysis of the energy consumption of an industrial building and development of the monitoring.** Nyyssoelae, H. (Insinoeoeritoimisto Olof Granlund Ky, Helsinki (Finland)); Kareoja, A.; Vetola, H. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1984. 123p. (In Finnish). Order Number DE92562903. Source: OSTI; NTIS.

The analysis of the energy consumption of an industrial building can be divided into three stages: field measurements, by the aid of which the present energy consumption of the building and its reasons are analyzed, the simulation of the energy consumption by computer and the normalisation of the measured consumption and the monitoring of the consumption. Measurements were accomplished at the Valmet factories. Using the results the importance and the necessary accuracy of the required measurements were surveyed. Based on the test results a special computer programme was developed for calculating the energy consumption of industrial halls.

31138 (NEI-NO--245) **Studies on dynamics and control of distillation columns.** Jacobsen, E.W. Trondheim Univ. (Norway). Norges Tekniske Hoegskole. 1991 175p. Order Number DE92563013. Source: OSTI; NTIS.

Distillation is an important unit operation in which a given feed is separated into two or more products of different compositions. The separation requires input of relatively large amounts of energy. Improved composition control of distillation columns may reduce the energy requirements significantly, and will in addition yield improved product recovery. A prerequisite for obtaining tighter composition control is a basic understanding of the column behavior. This thesis addresses different aspects of the dynamic behavior as well as control of distillation columns. It is shown that simple distillation columns, even with ideal vapor-liquid equilibrium, may have multiple steady- state solutions and unstable operating points. Two fundamentally different sources for the multiplicity and instability are presented. The dynamics and control of columns with unstable operating points are also addressed. Low-order dynamic models are frequently used in control studies of distillation columns. Such models are studied in this thesis, and it is shown that they in many cases have fundamental shortcomings which make them poor for feedback control studies. It is also shown that it is the high-frequency behavior (initial time response) which is most important to capture in a dynamic model for feedback control studies. One important conclusion is that the flow dynamics should be included in the dynamic model of a distillation column. Most researchers aming at improving the composition control of distillation column, focus on improving the control algorithms. However, distillation columns have inherent control limitations which limit the performance, even of the "best" controller. In this thesis it is shown that the control limitations may be significantly reduced by modifying the column design. 146 refs., 64 figs., 24 tabs.

31139 (NUTEK-R--92-8) **Black liquor gasification: Consequences for pulping process and energy balance.** Warnquist, B. (AaF-IPK, Stockholm (SE)); Svedberg, G.; Ihren, N.; Ulmgren, P.; Lindstroem, R. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Apr 1992. 86p. Order Number DE92563074. Source: OSTI; NTIS.

An investigation has been made with the aim to describe black liquor gasification processes and their effects in the kraft mill, the potential for increased electrical power production and requirements for research and development. There are two types of liquor gasification processes. Liquor gasification at high temperature, above 850 deg C, gives sodium sulphide carbonate smelt/green liquor and reduced gas as main products. An example is the Chemrec process. Liquor gasification at low temperature, below 800 deg C, gives sodium carbonate in solid form and reduced gas, i.a. with all sulphur in the form of H_2S. Examples are the MTCI process and ABB's process. The latter allows the handling of sulphur and sodium in separate streams. Consequently, there is a possibility for advanced modified kraft pulp cooking in two stages, with one high sulphidity and one low sulphidity liquor. More research is needed regarding the liquor gasification processes themselves, such as black liquor properties and -atomization, the chemistry of liquor gasification and alkali gasification/dust formation. Studies of pressurized black liquor gasification and energy and heat systems, both combined and hybrid systems need to be undertaken. Electric power production in a kraft pulp mill is estimated to become 1400-1600 kWh per tonne pulp, compared to a conventional system 1200-1300 kWh ptp. The former production figure could be increased by extending gas turbine, boiler and steam system efficiencies to their technical potential, according to the KTH studies. A future integrated pulp and paper mill can, with margin, be supplied with heat and electricity through this type of liquor and energy recovery.

31140 (OY/TEK-EL--9) **The suitability and operational cost of the electrolytic phenol wate water purification.** Luttu, J.; Paajala, J.; Vilppunen, P. Oulu Univ. (Finland). Energy Lab. May 1990. 35p. (In Finnish). Order Number DE92562908. Source: OSTI; NTIS.

The aim of the experiment was to find out the function and the suitability of the electrolytic waste water purification unit of Ekotekniikka Ltd to phenol containing water and to estimate operational costs in examined situations. Operational costs of the studied purification systems were estimated including following cost factors: power consumption excluding pumping, dissolving electrodes and salt additon. The suitability of the treating system was estimated mainly taking into account purification efficiency and residual concentration.

31141 **Electrochemical oxidation of organic materials.** Almon, A.C. To Dept. of Energy. 1991. USA Patent patent application 7-641,823. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019822. Source: OSTI; NTIS; GPO Dep.

This invention is a method and apparatus for the direct oxidation of organic materials, especially organic wastes, in an electrochemical cell. It fulfills the need for a simple, cost-effective way for generators of small quantities of waste to deal with that waste. It does not use an electron transfer agent, which may be a source of additional hazardous waste. The anode is made of carbon felt; the cathode is platinum; and the electrolyte is a strong oxidizer, preferably nitric acid. The potential difference is 2 to 3 volts; the current density is 0.15 to 0.25 A/cm^2. The porous barrier is a medium grade alumina frit or an ion exchange membrane. The organic materials are fed to the anode compartment; the resulting oxygen bubbling circumvents the need for stirring or circulating the waste. Many different types of waste (e.g. rubber gloves, TBP, process solutions, etc.) can be fed to the anode compartment without the need to process or store it. 3 figs. (DLC)

31142 (PNL-SA--20310) **An overview of heat exchanger enhancement techniques for industrial applications.** Somasundaram, S. (Pacific Northwest Lab., Richland, WA (United States)); Ohadi, M.M.; Richlen, S. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206112--3: 1992 American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) meeting, Baltimore, MD (United States), 27 Jun - 1 jul 1992). Order Number DE92019077. Source: OSTI; NTIS; GPO Dep.

An assessment is make of selected currently available heat exchanger enhancement techniques for single- and two-phase heat transfer mechanisms to determine their practicality and commercialization potential for different industrial applications. The assessment includes a screening review of the major techniques being investigated in the research community, and identification of selected passive techniques and determine their potential limitations with respect to industrial applications. A more detailed study of the research needs and the technology gaps is being conducted to address the issues of concern for each practical application of the chosen techniques. The technical and economic feasibility and the performance benefits of incorporating a particular technique in a heat transfer process is also discussed. The potential design, operational, and manufacturing cost issues that have prevented a technique from being widely commercialized are identified.

31143 (SAND--92-1518C) **Interfacial microchemical characterization needs in surface processing.** Gaarenstroom, S.W. (General Motors (United States)); Anderson, R.J.; Nelson, G.C.; Baird, R.J.; Zaluzec, M.J.; Coduti, P.L.; Liehr, M.; Mayanovic, R.A.; Powell, C.J.; Sherwood, P.M.A. Sandia National Labs., Albuquerque, NM (United States). [1992]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789.

(GMR–7661;CONF-911281–2: Workshop on surface processing, Dearborn, MI (United States), 10-12 Dec 1991). Order Number DE92018269. Source: OSTI; NTIS; GPO Dep.

Interfacial microchemical characterization is required in all aspects of surface processing as applied to transportation and utility technologies. Corrosion protection, fuel cells and batteries, wear surfaces, polymers and polymer-oxide interfaces, thin film multilayers, photoelectrochemical systems, and organized molecular assemblies are just a few examples of interfacial systems of interest to these industries. A number of materials and processing problems, both related to fundamental understanding and to monitoring manufacturing operations, have been identified where our microchemical characterization abilities need improving. Over twenty areas for research are identified where progress will contribute to improved understanding of materials and processes, improved problem-solving abilities, improved manufacturing consistency, and lower costs. Some of the highest priority areas for research include (1) developing techniques and methods with improved chemical specificity at interfaces, (2) developing fast, real-time surface and interface probes and (3) improving the cost and reliability of manufacturing monitors. Increased collaboration among University, Industry, and Government laboratories will be a prerequisite to making the required progress in a timely fashion.

31144 (TVA–92019073) **Energy efficient motors reference guide: First edition.** Sadanandan, N.D. (Tennessee Valley Authority, Chattanooga, TN (United States)); Eltom, A.H. Tennessee Valley Authority, Chattanooga, TN (United States). Mar 1992. 97p. Sponsored by Tennessee Valley Authority, Knoxville, TN (United States). Order Number DE92019073. Source: OSTI; NTIS.

The motor reference guide is the result of data and information collected and organized by the Industrial and Large Commercial staff of the Tennessee Valley Authority. The information was collected over several months from motor manufacturers, technical papers, textbooks, and files of former TVA engineers. Additionally, computer simulations were performed to develop data not currently available in literature. The guide is not intended to be a textbook on motors, but a quick and ready reference for the TVA field staff to assist in the technical and economic evaluation of energy-efficient motors versus standard motors. However, chapters on motor related topics such as rotating fields, power factor correction and impact of power quality on motor performances have also been included to complement the text.

3206 Municipalities and Community Systems

Refer also to citation(s) 31064, 31094, 31114, 31275, 31691

31145 (BFR-T–18-92) **Heating and cooling with low-temperature water: Prerequisities, experiences, possibilities.** Berglund, S. (AIB Anlaeggningsteknik AB, Solna (SE)); Olsson, U. Swedish Council for Building Research, Stockholm (Sweden). 1992. 48p. (In Swedish). Order Number DE92563095. Source: OSTI; NTIS.

The use of groundwater and surface water for heating and cooling purposes has been investigated during the 1980s. The experiences from six experimental plants are described as well as systems descriptions for the different methods. The heating and cooling systems are mainly based on direct heat exchange. Also mentioned is the use of low temperature water as heat source for heat pumps and in systems that includes refrigerating machinery.

31146 (DOE/CH/10093–107) **District heating and cooling program overview: Advanced energy concepts for utilities: Programs in utility technologies, fiscal years 1990–1991.** National Renewable Energy Lab., Golden, CO (United States). May 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-83CH10093. Order Number DE91002184. Source: OSTI; NTIS; GPO Dep.

An overview of the US DOE program on district heating and cooling is presented. The advantages of district heating and cooling and a description of the workings of such systems are included. (MHR)

31147 (NEI-DK–908) **Natural-gas-fired cogeneration plants with an electric power output of up to 1000 kW: Technology - Environment - Economy.** Dk-TEKNIK, Aalborg (Denmark). Energi og Miljoe. May 1992 43p. (In Danish). Order Number DE92562874. Source: OSTI; NTIS.

Cover titel: Etablering af naturgasfyrede kraftvarmevaerker med eleffekt mindre end 1000 kW.

Mini-cogeneration plants based on gas engines are increasing in number in Denmark. They are suitable for schools, sports halls, building blocks, market gardens and other small businesses with a normal heating demand of under 90 degrees centigrade. There are at present 14 Danish suppliers of systems producing 20 - 500 kW. Investment costs for plants vary greatly, from 6000 Danish kroner per kilowatt up to 12000 kroner per kilowatt. A mini-cogeneration plant would have a power and heat efficiency of 24-33% and 64-55% respectively. The total efficiency would be between 85-92% depending on the size of the flue gas cooler. Operational amd maintenance costs are between 5 and 12 Danish oere (an oere is worth one hundredth of a Danish krone) per kilowatt. 100 kW plants should be in operation 5600 hours per year, smaller ones for 7000 hours annually if the repay period should be 6-7 years. Most plants are able to fulfill the demand of maximum emission of 215 mg/MJ for nitrogen oxides and carbon monoxide. It has been found that lubrication oil lasts for a shorter period when used in relation to plants fired with Danish natural gas and there have been problems with cylinder heads in the gas engines wearing out. The Danish Energy Agency predicts that the total potential for mini-cogeneration plants in Denmark would constitute and efficiency of 200 MW electric power effect. (AB) (10 refs.).

31148 (NEI-DK–919) **Experiences gained in the use of prognoses for heat demand in Esbjerg.** Sejling, K. Technical Univ. of Denmark, Lyngby (Denmark). Inst. of Mathematical and Operations Research. Jan 1990 10p. (In Danish). Order Number DE92562864. Source: OSTI; NTIS.

The report deals with a model and estimation method which is used at a dual-purpose power plant in Esbjerg, (Denmark). The use of heat demand prognoses in the control and production of heat and power can result in savings in relation to production and distribution with the help of optimized control of the flow temperature. The cogeneration process becomes more efficient, and heat losses during distribution and heat pump costs are reduced. The uses of these prognoses, and the model and estimation method, are described in detail. Results based on data from the year 1989 are presented in the form of graphs illustrating heat production, both predicted and realized. Graphs also illustrate parameters of robust estimation models and daily and weekend profiles. The models are described as satisfactory, except in relation to the description of the distribution network. (AB).

31149 (RISO-M–2947) **Energy problems in the opration of water treatment plants in cold periods: Phase 1 (1988-1990).** Schleisner, L.; Scherfig, J.; Kilde, N.; Broend, S.; Rykaer, S. Risoe National Lab., Roskilde (Denmark). Systems Analysis. Jan 1992. 132p. (In Danish). Contract EM-1223/88-7. Order Number DE92562849. Source: OSTI; NTIS.

EFP-88.

Water treatment plants encounter problems in winter periods when the temperature of sewage is below 4 deg. C. This is due to the low efficiency of the biological processes at low temperatures. The purpose of the project was to investigate and propose solutions to these energy problems. The present report describes the first phase of the project, covering the period 1988-1990. During this period data was collected at several water treatment plants and a dynamic model able to calculate the heat loss in water treatment plants was developed. (au) (6 taps., 76 ills., 17 refs.).

3209 Education and Public Relations

Refer also to citation(s) 31064

33 ADVANCED PROPULSION SYSTEMS

Refer also to citation(s) 31143, 31344

31150 Solid state safety jumper cables. Kronberg, J.W. To Dept. of Energy. 22 Jan 1991. USA Patent patent application 7-643,317. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019824. Source: OSTI; NTIS; GPO Dep.

This invention consists of solid state jumper cables for connecting two batteries in parallel, having two bridge rectifiers for developing a reference voltage, a four-input decoder for determining which terminals are to be connected based on a comparison of the voltage at each of the four terminals to the reference voltage, and a pair of relays for effecting the correct connection depending on the determination of the decoder. No connection will be made unless only one terminal of each battery has a higher voltage than the reference voltage, indicating "positive" terminals, and one has a lower voltage than the reference voltage, indicating C^2 negative terminals, and that, therefore, the two high voltage terminals may be connected and the two lower voltage terminals may be connected. Current flows once the appropriate relay device is closed. The relay device is preferably a MOSFET (metal oxide semiconductor field effect transistor) combined with a series array of photodiodes that develop MOSFET gate-closing potential when the decoder output causes an LED to light.

3301 Internal Combustion Engines

Refer also to citation(s) 30454, 31189, 31400

31151 (DOE/AL/43059–T5) **[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Sixth quarterly progress report, October 15, 1988–January 15, 1989].** Southwest Research Inst., San Antonio, TX (United States). [1989]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-87AL43059. Order Number DE92018571. Source: OSTI; NTIS; GPO Dep.

Information available in the literature indicates that the particulate emissions from diesel engines can be reduced by controlling the fuel injection process or the air motion within the combustion chamber. Within the constraints of the current engine designs, the above approach generally results in increased NO/NO$_x$ emissions due to improvements in the combustion event. While the kinetic mechanism for NO/NO$_x$ emissions is well defined in terms of the extended Zeldovich mechanism, the complex nature of the diesel combustion process makes it impossible to predict the integrated effects of variations in the physical processes on the total NO/NO$_x$ emissions. While it is felt that both the particulate and the NO/NO$_x$ emissions can be controlled in the engine, the effects of variations in the physical processes must be defined for both the particulate and the NO/NO$_x$ emissions. The objective of this project is to develop a data base which defines the interactions of the injection, atomization, and mixing processes as well as the thermodynamic state and fuel composition on the particulate and the NO/NO$_x$ emissions. The experiments are being performed using standard diesel fuel injection equipment injecting into a flow-tube reactor, where the flow field and thermodynamic state are controlled and well defined. The particulate and NO/NO$_x$ emissions will be measured at point locations within the reactor, using a quenching probe in conjunction with a dilution tunnel as defined by the EPA specifications. The work plan for this project involves four general tasks or phases. These include: Task 1. Flow Modeling and Flow-Tube Reactor Preparation; Task 2. Flow Measurement and Spray Analysis; Task 3. Combustion Experiments; Task 4. Data Analysis; Accomplishments in each task are described.

31152 (DOE/AL/43059–T6) **[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly status report No. 7, January 15, 1989–April 15, 1989].** Southwest Research Inst., San Antonio, TX (United States). [1989]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-87AL43059. Order Number DE92018570. Source: OSTI; NTIS; GPO Dep.

Information available in the literature indicates that the particulate emissions from diesel engines can be reduced by controlling the fuel injection process or the air motion within the combustion chamber. Within the constraints of the current engine designs, the above approach generally results in increased NO/NO$_x$ emissions due to improvements in the combustion event. While the kinetic mechanism for NO/NO$_x$ emissions is well defined in terms of the extended Zeldovich mechanism, the complex nature of the diesel combustion process makes it impossible to predict the integrated effects of variations in the physical processes on the total NO/NO$_x$ emissions. While it is felt that both the particulate and the NO/NO$_x$ emissions can be controlled in the engine, the effects of variations in the physical processes must be defined for both the particulate and the NO/NO$_x$ emissions. The objective of this project is to develop a data base which defines the interactions of the injection, atomization, and mixing processes as well as the thermodynamic state and fuel composition on the particulate and NO/NO$_x$ emissions. The experiments are performed using standard diesel fuel injection equipment injecting into a flow-tube reactor, where the flow field and thermodynamic state are controlled and well defined. The particulate and NO/NO$_x$ emissions will be measured at point locations within the reactor, using a quenching probe in conjunction with a dilution tunnel as defined by the EPA specifications.

31153 (DOE/AL/43059–T7) **A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, April 15, 1989–July 14, 1989.** Ryan, T.W. III; Schwalb, J.A. Southwest Research Inst., San Antonio, TX (United States). 14 Jul 1989. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-87AL43059. Order Number DE92018569. Source: OSTI; NTIS; GPO Dep.

Some final preparations were made which included the following items: Hydrostatic testing of the 4in. x 4in. reactor section and the 6in. x 6in. flow straightener section; installation of copper tubes for water cooling on both sections; installation of the continuous-flow, high-pressure injection system; and selection of injection nozzle tips. In addition, work has progressed in the following areas: Instrumentation of combustion section; construction of turbulence generating grid; characterization of the fuel spray at ambient conditions; and initiation of procedure working up to combustion tests.

31154 (DOE/AL/43059–T8) **A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 July 1989–14 October 1989.** Ryan, T.W. III; Schwalb, J.A. Southwest Research Inst., San Antonio, TX (United States). 14 Nov 1989. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-87AL43059. Order Number DE92018715. Source: OSTI; NTIS; GPO Dep.

The previous progress report outlined the final preparation of a 4in. x 4in. pressurized test section in which combustion tests were to be performed under conditions typically observed in a diesel combustion chamber. Diesel fuel would be continuously sprayed perpendicular to the flow (simulating diesel injection into a swirling flow) under thermodynamic conditions as close to actual cylinder conditions as possible. The resulting steady combustion event could then be probed for CO, CO$_2$, NO/NO$_x$, and particulate emissions, and the dependence of those emissions on thermodynamic state, turbulence, and injection/atomization conditions could be studied. A few final preparations were made which included the installation of a pressure relief valve in the high-pressure part of the final supply system, and the installation of a check valve to maintain 100 psi fuel supply pressure in the low-pressure part of the final supply system. Upon completion of these items, several tests were performed, some of which involved diesel fuel injections only, and the rest which involved a steady combustion spray. Pressure, air flowrate/flow velocity, inlet air temperature, fuel injection pressure, and fuel flowrate were monitored throughout each test, and temperature was also monitored at several locations within the combusting zone. Visual observation of the injection and combustion events was possible through a 8 3/8in. D window mounted in the side of the test section, which allowed each test to be recorded on a color video-camera recording system. Some 35-mm photographs were also taken of the flame geometry.

31155 (DOE/AL/43059–T9) **A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 October 1989–14 January 1990.** Ryan, T.W. III; Schwalb, J.A. Southwest Research Inst., San Antonio, TX (United States). 14 Jan

1990. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-87AL43059. Order Number DE92018576. Source: OSTI; NTIS; GPO Dep.

Information available in the literature indicates that the particulate emissions from diesel engines can be reduced by controlling the fuel injection process or the air motion within the combustion chamber. Within the constraints of the current engine designs, the above approach generally results in increased NO/NO$_x$ emissions due to improvements in the combustion event. While the kinetic mechanism for NO/NO$_x$ emissions is well defined in terms of the extended Zeldovich mechanism, the complex nature of the diesel combustion process makes it impossible to predict the integrated effects of variations in the physical processes on the total NO/NO$_x$ emissions. While it is felt that both the particulate and the NO/NO$_x$ emissions can be controlled in the engine, the effects of variations in the physical processes must be defined for both the particulate and the NO/NO$_x$ emissions. The objective of this project is to develop a data base which defines the interactions of the injection, atomization, and mixing processes as well as the thermodynamic state and fuel composition on the particulate and NO/NO$_x$ emissions. The experiments are being performed using standard diesel fuel injection equipment injecting into a flow-tube reactor, where the flow field and thermodynamic state are controlled and well defined. The particulate and NO/NO$_x$ emissions will be measured at point locations within the reactor, using a quenching probe in conjunction with a dilution tunnel as defined by the EPA specifications.

31156 (NUTEK-B-92-4) **The diesel engine and its potential for improvement.** Egnell, R. (Aspen Utvecklings AB, Lund (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Mar 1992. 350p. (In Swedish). Order Number DE92563073. Source: OSTI; NTIS.

With 7 p English summary.

The report presents a historical and technical review of the Diesel engine with special attention to environmental properties and developments that can be made in the near future. The review is limited to engines for heavy vehicles. Interesting areas for research and development mainly connected to improved efficiency and air pollution abatement are briefly discussed. Includes a 7 p english summary. (200+ refs., 300+ figs.).

31157 (SAND-92-8507) **Soot and fuel distribution imaging in a diesel engine.** Dec, J.E. (Sandia National Labs., Livermore, CA (United States)); Siebers, D.L.; Espey, C.; zur Loye, A.O. Sandia National Labs., Livermore, CA (United States). Jun 1992. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DR00789. (CONF-920815-5: 204. American Chemical Society national meeting, Washington, DC (United States), 23-28 Aug 1992). Order Number DE92018658. Source: OSTI; NTIS; GPO Dep.

Various 2-D imaging diagnostics have been used to investigate the soot and fuel distributions in the cylinder of a direct-injection diesel engine modified for optical access. Planar laser-induced incandescence (LII), planar elastic scattering, and natural flame luminosity imaging were used for soot distribution studies. The fuel distribution was examined via planar laser-induced fluorescence (LIF) and planar elastic/Mie scattering. To minimize optical attenuation, a lowsooting fuel (whose vaporization and combustion characteristics are typical of standard diesel fuels) was developed, compared with a standard fuel, and used for most studies. These studies showed that the soot is distributed throughout the cross-section of the combusting spray plume, and that there is generally a higher concentration of larger soot particles towards the leading edge of the plume. The extent of the soot distribution upstream towards the injecter varies with engine speed and injection pressure. Fuel remains as a liquid to a maximum of about 33 mm from the injecter, although vaporized fuel penetrates much further. Only vapor-phase fuel is found in the region where most combustion occurs.

31158 (UCRL-JC-108710) **Measurements of cellular structure in spray detonation.** Papavassiliou, J. (McGill Univ., Montreal, PQ (Canada). Dept. of Mechanical Engineering); Makris, A.; Knystautas, R.; Lee, J.H.; Westbrook, C.K.; Pitz, W.J. Lawrence Livermore National Lab., CA (United States). Oct 1991. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9107160-3: 13. international colloquium on dynamics of explosives and reactive systems, Nagoya (Japan), 28 Jul - 31 aug 1991). Order Number DE92019580. Source: OSTI; NTIS; GPO Dep.

The cellular structure of heterogeneous detonations in a low vapor pressure fuel (decane) droplet mixture with oxygen and oxygen-nitrogen was studied in the present investigation. The aerosol was generated by an ultrasonic nebulizer and the fuel concentration of the mixture was regulated by monitoring the volume flow rate of oxygen and nitrogen through the nebulizer. The vertical detonation tube is 64 mm in diameter and 3 m long and ignition was by a powerful spark (120 joules stored energy) or a high explosive detonator. Velocity was measured with ionization probes, pressure by a PCB piezoelectric transducer and cell size by a smoked metallic foil inserted into the top end or centre of the detonation tube. The initial pressure of all the experiments was 1 atmosphere. In order to compare the time scales associated with the physical processes of droplet breakup, heat transfer, evaporation, and mixing, experiments were also carried out in the tube heated to 100°C and 185°C, using electrical heating tape, to ensure a homogeneous gas phase mixture of decane-oxygen-nitrogen. Comparison of the cell size for the same mixture in the cold and the heated tube permits one to separate the time scales associated with the physical processes and the chemical kinetic rate processes. The results from the heated tube for the homogeneous vapor phase decane detonations are similar to those for the common gaseous fuels in the alkane group (i.e. ethane, propane, butane). Corresponding results for the heterogeneous case (cold tube) of aerosol decane detonation indicate that the cell size is larger by a factor of about 2, for the present case of 5 μm particle size. The measurements of cellular structure obtained experimentally have been compared to the computed results determined using the ZND chemical kinetic detonation model.

31159 (UCRL-JC-110069) **The intensity of knock in an internal combustion engine: An experimental and modeling study.** Cowart, J.S. (Ford Motor Co., Dearborn, MI (United States). Scientific Research Lab.); Haghgooie, M.; Newman, C.E.; Davis, G.C.; Pitz, W.J.; Westbrook, C.K. Lawrence Livermore National Lab., CA (United States). Jun 1992. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9210152-1: 1992 Society of Automotive Engineers (SAE) international fuels and lubricants meeting and exposition, San Francisco, CA (United States), 19-22 Oct 1992). Order Number DE92019504. Source: OSTI; NTIS; GPO Dep.

From this knock intensity modeling study important initial results were obtained, as well as direction for future work, The detailed model study showed that knock intensity can be correlated to knock model results, thus future use of knock occurrence and intensity modeling for engine development appears viable. The detailed model's predicted rate of carbon monoxide concentration change (@ 1100K) with time revealed that a linear correlation existed with the percent cycles knocking, while the rate of end-gas temperature change (@ 1000K) correlated approximately linearly with the fraction of cycles knocking. The reduced model shows a similar linear correlation of dT/dt with percent cycles knocking, but the correlation is much weaker than that observed with the detailed model. These results indicate that reactions which lead to products formation and the accompanying heat release must be taken into account in the reduced model. These reactions are of the type which consume aldehydes and olefins to produce carbon monoxide and thereby carbon dioxide.

3302 External Combustion Engines

Refer also to citation(s) 31062

31160 (EGG-M-92261) **Study of wall heat transfer from a high temperature dissociated hydrogen impinging jet.** Stickler, L.A.; Chang, C.H. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 11p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9209166-1: Idaho National Engineering Laboratory computing symposium, Idaho Falls, ID (United States), 22-24 Sep

1992). Order Number DE92017845. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Numerical simulations, using a newly developed computer code, LAVA are performed in order to determine the heat transfer at the thrust chamber wall of a nuclear thermal rocket due to impinging jets of high temperature dissociated hydrogen propellant. The propellant discharging from the nuclear reactor is modeled as a two dimensional circular jet at a temperature of 3200 K with an average Mach number of 0.3. Solid surfaces are assumed to be fully catalytic. Three cases of thrust chamber wall temperature were examined, 2500, 2750, and 3000 K. Recombination of atomic hydrogen at the wall is the dominating heat transfer mechanism. A minimum heat flux of 7.8 MW/m^2 is obtained at a wall temperature of 2500 K.

3303 Electric-Powered Systems

Refer also to citation(s) 31043

31161 (BNL–52302, pp. 1) **New York State Maglev related programs.** Howansky, H.C. (NYSERDA, Albany, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

New York's transportation sector currently consumes over 41% of the total state energy use. Petroleum products are the source of approximately 95% of transportation energy use, and contribute the vast majority of carbon dioxide (CO), oxides of nitrogen (NO_x) and hydrocarbon air pollution in the State. Projections indicate the total vehicle miles traveled will double in the next twenty-five years, thus further adding to air pollution, energy use and traffic congestion. Transportation is an integral ingredient in an industrialized economy. If our economy is to grow, so will our transportation needs. Unfortunately, our existing modes of transportation are reaching saturation. Emerging technologies which potentially offer solutions to these problems include magnetically levitated (Maglev) and very high speed rail (VHSR) surface transportation. These electrically powered forms of transportation, operating at speeds up to 300 mph, are projected for use as an intercity transportation mode connecting cities within a range of 600 miles. The New York State Energy Research and Development Authority (NYSERDA) Maglev related activities consist of; (1) Phase I: New York State Technical and Economic Maglev Evaluation, (2) Phase II: High Speed Surface Transit Study, (3) New York State Support for Federally Funded Maglev Research. This paper reports on Phase I and Phase II.

31162 (BNL–52302, pp. 6-10) **Federal Maglev program.** Harding, J. (Federal Railroad Administration, Washington, DC (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

The Federal Railroad Administration (FRA), the U.S. Army Corps of Engineers (USACE), and the Department of Energy (DOE) are working in partnership with the private sector and state governments to assess the role of Maglev in the Nation's transportation future. The goal of this cooperative effort, the National Maglev Initiative (NMI), is the improvement of intercity transportation in the 21st Century through the development and implementation of commercially viable, advanced Maglev systems. This paper reports on the progress of this project.

31163 (BNL–52302, pp. 11-16) **International Maglev technology center.** Kuroki, Tsugunari E. (IMTC, Waltham, MA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

'Linear Motor Car - Maglev' technology offers an unique solution to world-wide problems. One of them, which is currently reconsidered in the U.S., is the application to a high speed ground transportation system, which is safe, fast, free of noise and vibration, free of pollution, and also economical to operate. The U.S. Department of Transportation's Federal Railroad Administration, along with the Department of Energy and the U.S. Army Corps of Engineers, are in the process of re-assessing the U.S. research and development need of Maglev technology. But if the U.S. decides to boost a major Maglev program in the near future, what would be the purpose and the strategy for it? As the U.S. re-enters the race for Maglev technology in cooperation of or in competition with foreign nations, it will be necessary to study a wide range of Maglev and Maglev-related activities which have taken place outside the United States in the past twenty years. This is due to the fact that the U.S. lacks a crucial ingredient – actual Maglev hardware, in order to conduct some forms of 'reverse engineering.' This paper addresses two problems which could inhibit the current and the future U.S. Maglev effort. They are the problem of 'perception,' and the problem of 'information.'

31164 (BNL–52302, pp. 22-26) **Design of advanced stray field shielding for Maglev.** Fugate, D. (Westinghouse Science Research Center, Pittsburgh, PA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

Because the magnetic fields in Maglev are large enough to levitate significant loads, the potential exists for large stray fields. Consideration for human exposure, to protect persons wearing pacemakers for example, and the need to protect electronics will result in guidelines for the maximum allowable field levels within different regions of a Maglev system. Attenuating stray fields from Maglev sources such as levitation and guidance magnets to allowable levels will add to the cost, weight, and power requirements of a Maglev system. There are essentially two methods for shielding magnetic fields; passive shielding and active shielding. Passive shielding of dc magnetic fields has traditionally involved high permeability materials which provide a preferred low reluctance path for the magnetic fields. A more recent passive shielding method utilizes superconducting material which totally excludes magnetic fields if the magnitudes are below the material dependent critical level H_{C1}. Above H_{C1}, shielding is dependent on the flux pinning characteristics of the superconductor materials. This paper discusses active shielding systems utilizing strategically placed coils to create canceling magnetic fields, thus reducing the field levels in the appropriate regions of space.

31165 (BNL–52302, pp. 27-28) **Maglev system concept using 20-K high-temperature superconductors.** Hull, J.R. (Argonne National Lab., IL (United States)); He, Jianliang. Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

Magnetically levitated high-speed ground transportation (Maglev) has the potential to benefit the overall transportation infrastructure, provide more energy-efficient transportation, reduce the environmental effects of transportation, and reduce dependency on foreign energy supplies. Traveling at approximately 500 km/h (300 mi/h) for distances of up to about 650 km (400 mi), Maglev will most likely operate between hub airports in major cities. It is expected that both airport and highway congestion will be diminished as a result of successful implementation of this technology. A major factor in the eventual incorporation of Maglev technology into the transportation sector will be the achievement of a low system capital cost. A major cost component of Maglev is the guideway, and a substantial fraction of this cost would be incurred in providing electrical power along the guideway for propulsion energy. In this paper, the authors explore the advantages and disadvantages of a specific Maglev concept that eliminates this requirement.

31166 (BNL–52302, pp. 29-35) **Emerging Maglev research needs.** Cope, D. Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

High performance air core superconducting magnets inherently have a relatively large stray DC magnetic field. In addition, an AC field is generated by harmonics of the linear synchronous motor windings. These fields potentially create safety issues and nuisance issues. Personnel, baggage and SC magnets need shielding from AC and DC magnet fields. Superconducting magnetic energy storage (SMES) devices represent an opportunity to reduce the cost of power for the Maglev system. SMES devices are devices which store energy magnetically and, with the appropriate electrical circuits, can deliver the energy when it is needed. Power cost is driven by generation and transmission costs. Appropriate geographic siting of SMES devices potentially can reduce these costs significantly. This paper will discuss two of the many emerging research topics for magnetically levitated trains, herein abbreviated Maglev. These issues are magnetic field shielding and superconducting magnetic energy storage. The fundamental issue, however, is that these topics are NOT enabling technologies for Maglev. Rather, the research described below will improve the safety and economy of the system. The Maglev transportation system can move forward even as this research is pursued simultaneously.

31167 (BNL–52302, pp. 36-42) **Magnetic shielding in Maglev.** Bourdillon, A.J. (State Univ. of New York, Stony Brook (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

It is known that magnetic fields pose a health problem in Maglev. The field strengths, both DC and AC, are predictable. They can be shielded but at the expense of increased vehicle weight. Safe levels for both DC and AC fields, especially the latter, are not yet finally determined. The topics discussed in this paper include computerized simulations of magnetic fields for selection of magnetic shields and vehicle geometry, optimization of shielding materials, and development of limits for exposure to magnetic fields.

31168 (BNL–52302, pp. 43-53) **Simulation of Maglev ride environment.** Powell, J. (Brookhaven National Lab., Upton, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper addresses the simulation of the ride environment of magnetically levitated trains (Maglev) as a means of determining design guidelines and comparing passenger comfort with the alternatives such as high speed rail. The topics of the paper include passenger ride environment for other transport modes, Maglev routes along the interstates and impact on ride environment, capability for simulating Maglev ride environment, remediation techniques, and recommendations. This paper consists of the overheads from the presentation.

31169 (BNL–52302, pp. 58-60) **Magnet research required for Maglev.** Huson, F.R. (Texas Accelerator Center, Woodlands (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper addresses the information required for the development of Maglev magnets and cryogenics and recommends research avenues to be supported by the federal government. The topics of research identified include selection of superconducting wire material, design and testing of superconducting switches, development of magnet structure and size, how method of guidance and levitation affects design, cryostat design, magnet supports design, shielding of the magnetic fields, design for low heat transfer and refrigerator design.

31170 (BNL–52302, pp. 61-65) **Development of (1) cable in conduit conductors and of (2) an approach to FMECA for Maglev magnet systems.** Thome, R.J. (Massachusetts Institute of Technology, Cambridge (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper gives an assessment of current status and recommended avenues for further research for cooling superconducting coil systems and for developing an approach to failure modes effects and criticality analysis for magnets. The areas of recommended research include conductor development, refining of computer codes for prediction of performance in terms of energy margin, stability and quench, design of reliable hydraulic manifolds and joints as well as electrical joints and connections to power leads, development of reliable persistent switches, literature survey of magnet system component failures, reliability and availability.

31171 (BNL–52302, pp. 66-68) **Light weight, high field, stable, superconducting magnets for advanced transportation systems.** Lubell, M.S. (Oak Ridge National Lab., TN (United States)); Dresner, L.; Kenney, W.J.; Lue, J.W.; Luton, J.N.; Schwenterly, S.W. Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

Although the Guideway may be the most expensive component of a Maglev system, the importance of a suitable magnet system should not be underestimated. The reliability of operation of Maglev depends on the superconducting magnets performing to their specifications in a reliable manner (i.e., without training or quenching). Besides reliability the magnets should produce high field, be sufficiently stable to withstand reasonable perturbations, be light weight, be protected in the event of a quench, and be economical (although performance should outweigh cost). This paper discusses the development of magnets that have these features. The authors magnet designs are based on internally cooled, cable-in-conduit superconductor with Polymer Matrix Composites (PMC) as the structural reinforcement. Although the initial work is with metallic superconductors such as NbTi, The processes being developed will be applicable to the High Temperature Ceramic Superconductors when they become suitable for magnet applications.

31172 (BNL–52302, pp. 69-73) **Cryogenic refrigeration for Maglev requirements and opportunities.** Smith, J. Jr. (Massachusetts Inst. of Tech., Cambridge (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This presentation examines the advantages of mechanical cryogenic refrigeration over conventional methods for application to magnetic levitation transportation systems. The topics covered in the presentation include the application of mechanical refrigeration to superconducting devices, the cryogenic system heat loads, cooling system, dewar, operating temperatures, refrigeration source, and design opportunities for mechanical refrigeration. This paper consists of the overheads from the presentation.

31173 (BNL–52302, pp. 74-80) **He II and Maglev - Is there a role?.** Christianson, O. (Westinghouse Science Research Center, Pittsburgh, PA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

In this paper He II operation of superconducting magnets is reviewed to ascertain advantages of disabilities with Maglev use. The reduced temperature of operation results in increased critical currents such that the total amount of superconductor can be reduced, either by increasing the transport current and reducing the number of turns, or by reducing the area of superconductor and stabilizer for a constant transport current. Increased cooling reduces the amount of stabilizer necessary for cryostable operation, such that small stabilizer to superconductor ratios may not preclude cryostable operation. Transient He II cooling exists for larger times, compared to transient normal helium cooling, such that larger disturbances may exist in the magnet without affecting stability. However, the reduced operating temperature increases the refrigeration power input. A detailed system study needs to be performed and a compact He II refrigeration system needs to be designed to better assess the impact of He II cooling on Maglev superconducting magnet operation.

31174 (BNL–52302, pp. 81-84) **R and D needs and opportunities for application of space vehicle cryogenic technology to Maglev systems.** Peck, S. (General Dynamics Space System, San Diego, CA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This presentation addresses the status of cryogenic technology and the areas where further research is recommended to support Maglev transportation systems. The recommended areas of research discussed include magnet stability, model magnet construction with mechanical testing, weight reduction and cryogenic system type and location, advanced helium refrigeration and cryostats.

31175 (BNL–52302, pp. 85-87) **High efficiency propulsion and levitation systems.** Thornton, R.D. (Massachusetts Inst. of Tech., Cambridge (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper examines the current status of magnetic levitation technology (Maglev) and presents areas of recommended research. The topics of the paper include the benefits of Maglev compared with other modes of travel, the preference of electrodynamic suspension over electromagnetic suspension, and research needs concerning switching, stopping and starting a Maglev vehicle.

31176 (BNL–52302, pp. 88-91) **Active damping of Maglev vehicles using superconducting linear synchronous motors.** Kuznetsov, S. (Power Silicon Monolithic, Inc., East Pittsburgh, PA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper explores the use of linear synchronous motor control to provide active damping for magnetically-levitated vehicles. Using a single LSM only heave and surge damping can be provided, but, with a dual LSM, roll and yaw damping can also be achieved. The paper gives design data applicable to the reference design of the P.S.M. 500 km/h Maglev system.

31177 (BNL–52302, pp. 92-97) **Use of AC suspension magnets for Maglev propulsion and levitation.** Hull, D.R. (Intermagnetics General Corp., Guilderland, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper provides a status of technology for suspension magnets for magnetic levitation transportation systems and identifies benefits and problems associated with the use of alternating current (AC) suspension magnets. The problems discussed provide the basis for recommending further research in the areas of superconducting AC materials, on-board power supply, superconducting linear induction motor, superconducting attractive magnet systems, and cryogenic cooling systems.

31178 (BNL–52302, pp. 98-101) **An integrated approach to develop conductors, coils, cryogenic system, on-board magnet assembly.** Stekly, J. (IGC-Field Effects, Atcon, MA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

In order to develop a compact, reliable, low heat load superconducting Maglev vehicle magnet system, it is necessary to take an integrated approach to defining a design. For each potential major coil/track combination utilizing superconductors, the magnetic configuration, winding bundle, support structure, cryostat, and refrigeration should be iterated and compared among each other to achieve the required static and dynamic forces to levitate, guide and propel the vehicle under normal and emergency conditions within established constraints of weight, reliability, cost, and external magnetic fields. This paper describes this integrated approach.

31179 (BNL–52302, pp. 102-105) **Parametric studies of suspension and propulsion subsystems in a Maglev transportation system.** Yang, F.C. (Kaman Science Corp., Santa Monica, CA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

There are two techniques for magnetic levitation. An electromagnetic suspension (EMS) method makes use of the forces between magnets, either permanent magnets or electromagnets. An electrodynamic suspension (EDS) method relies on the forces between a magnetic-field source and the eddy currents induced by it in a conducting track. There are many candidate propulsion methods. Linear synchronous motors (LSM) and linear induction motors (LIM) are two examples. There are many ways to apply the suspension methods and to configure the propulsion subsystems. As of today, there are sparse design studies and prototypes. However, there is no clear evidence as to which combination is the best. The decision on which combination to be preferred should come from a detailed trade-off study among the system performance, economic conditions, environmental impact, etc.

31180 (BNL–52302, pp. 115-119) **The impact of right-of-way geometry on ride quality.** Deutsch, L. (Project Engineer Energy Systems, Bethpage, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper examines the effect on achievable speed, and passenger comfort, and what compromises must be made to design a magnetic levitation (Maglev) transportation system using existing rights-of-way. The author identifies and discusses two areas that need further research. These are developing the analytical methods to optimize the guideway centerline path for a particular given right-of-way and investigating new ride quality criterion specifically developed for Maglev vehicles.

31181 (BNL–52302, pp. 120-122) **Need for the detection of guideway misalignment and foreign objects.** Proise, M. (Space Systems, Bethpage, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper addresses the need for a detection system for foreign objects and guideway misalignment for magnetic levitation (Maglev) transportation systems. The topics discussed as requiring more research are minimizing the probability of obstacle occurrence and guideway misalignment, and development of a detection system that recognizes objects or guideway displacement beyond determined limits and can operate under a wide range of temperature conditions being unaffected by wind, gusts, rain, snow, fog, direct or reflected light from sun or street lights, rising heat waves from guideway, and audible noise.

31182 (BNL–52302, pp. 123-127) **Safety factors on Maglev systems.** Widawsky, D.I. (Two World Trade Center, New York, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper identifies existing information on Maglev system safety issues and discusses areas for further research. The areas discussed include switching, automatic train controls/manual override, on-board fire/emergency shutdown/evacuation, vehicle interiors/cabin pressure/window glazing, guideway design and construction standards, emergency braking/loss of power/propulsion/levitation/guidance, guideway integrity/obstacles on track, electrical/magnetic field shielding/health risks, aerodynamic forces, all weather conditions/high winds/earthquakes/geological conditions, operator/staff training, guideway separation from other uses.

31183 (BNL–52302, pp. 128-132) **Sustained passenger G-loads in Maglev: Needs and payoffs.** Kokkins, S.J. (Foster Miller, Inc., Waltham, MA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

The worldwide interest in high speed Maglev ground transportation is leading toward detailed engineering development of Maglev as a complete system. These studies in turn are bringing to light the important effects that many key parameters have both on the system design configuration, and on the costs to construct and maintain that system. The purpose of this short paper is to highlight one area in which some straightforward research could pay large dividends in the near-term for Maglev route layouts now being evaluated. This research can include a fresh review and analysis of existing data as well as new work in specific areas. The acceptable levels of sustained g-limits for Maglev passengers has a direct relationship to allowable combinations of speed and turn radius. This is true for both horizontal and vertical curves, and is well-known to transportation engineers. For the very high ground speeds of Maglev (500 + kph or 300 mph, even before considering evacuated tube systems), the resulting curve radii can be several kilometers, using present sustained horizontal and vertical g-levels commonly found in high speed rail and similar types of ground transport.

31184 (BNL–52302, pp. 133-135) **Institutional obstacles to the development of Maglev in the United States.** Bohlke, B.M. (Parsons Brinckerhoff Quade and Douglas, Inc., Reston, VA (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

The most imposing barriers to commercial implementation of Maglev in the United States are institutional barriers – technological challenges and requirements pale in comparison. Although further technological developments are required in each of the Maglev subsystems, these can be overcome with time, logic, and ingenuity. Changes in policy, regulations and congressional and parochial jurisdictional boundaries demands planned, coordinated, and sustained efforts by all interested to educate local, state and federal officials and legislators about the short and long term benefits of Maglev to justify allocation of necessary funding.

31185 (BNL–52302, pp. 136-142) **Threshold Maglev research and development program - A no regrets approach to Maglev R and D.** Rote, D. (Argonne National Lab., IL (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

This paper describes an alternative magnetic levitation (Maglev) transportation system research and development plan that will provide a knowledge base to support sound decisions, maintain the Maglev program momentum through possible funding gaps, and permit long-lead-time activities to begin. The author presents an approach to defining a program to accomplish this in a Threshold R and D program.

31186 (DOE/NV/10418–3) **Single-shaft electric propulsion system technology development program – ETX-II: Final technical report.** Ford Motor Co., Dearborn, MI (United States). Research Staff; General Electric Co., Schenectady, NY (United States). Corporate Research and Development Center. Oct 1990. 228p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-85NV10418. Order Number DE92019410. Source: OSTI; NTIS; GPO Dep.

In 1981, discussions between Ford and General Electric (GE) evolved a concept for an advanced electric vehicle powertrain, which was subsequently presented to the US Department of Energy (DOE) as an unsolicited proposal. The concept involved a combination of technology from Ford and GE that would result in a unique powertrain based on a motor and transmission concentric with the drive wheel axis. Initial work suggested that the entire motor/transaxle combination could be expected to be smaller and lighter than the direct current (dc) motors that were in use in electric vehicles at that time and that the powertrain could be expected to be more efficient than other available powertrains. This program (ETX-I) was awarded to Ford Motor Company and it was established that the most likely first introduction of an electric vehicle would be in the form of a fleet of small commercial vans. The ETX-II propulsion system concept was aimed at advancing the technology through improving the size, weight, efficiency, reliability, and cost characteristics of the ETX-I powertrain and by integrating advanced battery technologies compatible with the powertrain to form a complete propulsion system. Unique developments for the

ETX-II program included the transaxle, a two-speed automatic transmission and three-phase interior permanent magnet alternating current (ac) motor on a common axis integrated with the rear axle of the test bed van; The traction battery selected for this propulsion system was the sodium-sulfur battery. This was the only advanced technology that had been developed to a point that would allow the test vehicle to have a range of over 160 kilometers (100 miles) without the battery exceeding 25% of the vehicle's gross weight.

3304 Hybrid Systems

Refer also to citation(s) 31043, 31186

3307 Emission Control

Refer also to citation(s) 31151, 31152, 31153, 31154, 31155, 31157, 31189

31187 (ORNL--6715) **Motor vehicle fuel economy, the forgotten HC control stragegy?.** Deluchi, M.; Wang, Quanlu; Greene, D.L. Oak Ridge National Lab., TN (United States). Jun 1992. 292p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019064. Source: OSTI; NTIS; GPO Dep.

Emissions of hydrocarbons from motor vehicles are recognized as major contributors to ozone pollution in urban areas. Petroleum-based motor fuels contain volatile organic compounds (VOC) which, together with oxides of nitrogen, promote the formation of ozone in the troposphere via complex photochemical reactions. VOC emissions from the tailpipe and evaporation from the fuel and engine systems of highway vehicles are believed to account for about 40% of total VOC emissions in any region. But motor fuels also generate emissions throughout the fuel cycle, from crude oil production to refining, storage, transportation, and handling, that can make significant contributions to the total inventory of VOC emissions. Many of these sources of emissions are directly related to the quantity of fuel produced and handled throughout the fuel cycle. It is, therefore, reasonable to expect that a reduction in total fuel throughput might result in a reduction of VOC emissions. In particular, reducing vehicle fuel consumption by increasing vehicle fuel economy should reduce total fuel throughput, thereby cutting total emissions of VOCS. In this report we identify the sources of VOC emissions throughout the motor fuel cycle, quantify them to the extent possible, and describe their dependence on automobile and light truck fuel economy.

3308 Alternative Fuels

Refer also to citation(s) 30585

31188 (ANL--92/31) **Reformers for the production of hydrogen from methanol and alternative fuels for fuel cell powered vehicles.** Kumar, R.; Ahmed, S.; Krumpelt, M.; Myles, K.M. Argonne National Lab., IL (United States). Aug 1992. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92019300. Source: OSTI; NTIS; GPO Dep.

The objective of this study was (i) to assess the present state of technology of reformers that convert methanol (or other alternative fuels) to a hydrogen-rich gas mixture for use in a fuel cell, and (ii) to identify the R&D needs for developing reformers for transportation applications. Steam reforming and partial oxidation are the two basic types of fuel reforming processes. The former is endothermic while the latter is exothermic. Reformers are therefore typically designed as heat exchange systems, and the variety of designs used includes shell-and-tube, packed bed, annular, plate, and cyclic bed types. Catalysts used include noble metals and oxides of Cu, Zn, Cr, Al, Ni, and La. For transportation applications a reformer must be compact, lightweight, and rugged. It must also be capable of rapid start-up and good dynamic performance responsive to fluctuating loads. A partial oxidation reformer is likely to be better than a steam reformer based on these considerations, although its fuel conversion efficiency is expected to be lower than that of a steam reformer. A steam reformer better lends itself to thermal integration with the fuel cell system; however, the thermal independence of the reformer from the fuel cell stack is likely to yield much better dynamic performance of the reformer and the fuel cell propulsion power system. For both steam reforming and partial oxidation reforming, research is needed to develop compact, fast start-up, and dynamically responsive reformers. For transportation applications, steam reformers are likely to prove best for fuel cell/battery hybrid power systems, and partial oxidation reformers are likely to be the choice for stand-alone fuel cell power systems.

31189 (ANL/CP--76765) **Meeting future exhaust emissions standards using natural gas as a vehicle fuel: Lessons learned from the natural gas vehicle challenge '92.** Rimkus, W.A.; Larsen, R.P. Argonne National Lab., IL (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209160--6: International symposium on energy, environment and information management, Argonne, IL (United States), 15-18 Sep 1992). Order Number DE92019670. Source: OSTI; NTIS; GPO Dep.

The Natural Gas Vehicle Challenge '92, organized by Argonne National Laboratory and sponsored by the US Department of Energy, the Energy, Mines, and Resources - Canada, the Society of Automotive Engineers, and many others, resulted in 20 varied approaches to the conversion of a gasoline-fueled, spark-ignited, internal combustion engine to dedicated natural gas use. Starting with a GMC Sierra 2500 pickup truck, donated by General Motors, teams of college and university student engineers strived to optimize Chevrolet V-8 engines operating on natural gas for improved emissions, fuel economy, performance, and advanced design features. This paper focuses on the results of the emission event, and compares engine mechanical configurations, engine management systems, catalyst configurations and locations, and approaches to fuel control and the relationship of these parameters to engine-out and tailpipe emissions of regulated exhaust constituents. Nine of the student-modified trucks passed the current levels of exhaust emission standards, and some exceeded the strictest future emissions standards envisioned by the US Environmental Protection Agency. Factors in achieving good emissions control using natural gas are summarized, and observations concerning necessary components of a successful emissions control strategy are presented.

31190 (SV-UG--92-3) **Natural gas and biogas vehicles: Projects and activities during 1991.** Ekeborg, T. (Vattenfall Energisystem AB, Vaellingby (SE)). Vattenfall Utveckling AB, Vaellingby (Sweden). 27 Jan 1992. 29p. (In Swedish). Order Number DE92563092. Source: OSTI; NTIS.

This report describes a few current Natural Gas Vehicle projects and a sample of interesting activities during 1991 in Scandinavia and other countries. A comparison of other alternative fuels is also presented. The first part of the Co-Nordic Natural Gas Bus Project is completed and a final report have been published during the year. This part mainly consisted of development and optimization of two heavy duty diesel engines for natural gas operation, with the purpose to find out weather 'significantly reduced emissions' can be obtained with natural gas as a fuel in city buses. The very low emission targets were almost reached, and the potential for the significant reduction was proven. The Co-Nordic Gas Bus Project is now continuing with its second part, in which the effort will be to eliminate different barriers, such as legislative matters, and to facilitate the introduction of natural gas buses in Scandinavia. The transit company in Oslo is planning to run 40 of its city buses on LNG. Landfill gas from a garbage dump will be used. The plans are to dry, purify and then liquify the gas at the production site, and then transport the LNG by gas truck to the refuelling station at the bus garage. A demonstration project is going on in Varberg in the southwest of Sweden, with the purpose to test a home refuelling appliance (HRA) under Swedish conditions. The HRA is installed at a one-family house. The owners car, a Volvo 740 that has been converted to natural gas, is refuelled during the night by the HRA. The operation started in May 1991 and will be evaluated after one year. A comprehensive project aiming at developing an environmentally healthy transportation system for the area of Goeteborg is going on. The project includes various parts, one concerning natural gas vehicles. The objective is to run about 300 heavy vehicles on natural gas by the year 1996.

35 ARMS CONTROL

3501 Policy, Negotiations, and Legislation

31191 (CNIC–00401) **Space nonweaponization. An urgent task for arms control.** Du Xiangwan (Institute of Applied Physics and Computational Mathematics, Beijing, BJ (China)); Pan Jusheng; Zhang Xinwei; Du Shuhua; Xu Changgen. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 18p. (In Chinese). (IAPCM–0016.). Order Number DE93602444. Source: OSTI; NTIS (US Sales Only); INIS.

The authors attempt to expound the basic points of veiw and put forward a proposal on the space nonweaponization. The authors analyse the nature of space weaponry and its impact on arms race and point out that the space nonweaponization is an urgent task for arms control. The relations between prohibition of space and ASAT weapons, between prohibition of space weapons and reduction of nuclear weapons and between space weapon and nuclear test are all analysed. The inadequacy of the existing space treaties is made clear based on the evaluation. It is hoped that a verifiable treaty on the prohibition of space weapons should be made and international cooperation on peaceful use of outer space is necessary.

31192 (LA–12364) **The Strategic Arms Reduction Treaty and its verification: Report No. 12.** Thomson, D.B. Los Alamos National Lab., NM (United States). Jul 1992. 49p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019466. Source: OSTI; NTIS; GPO Dep.

The Strategic Arms Reduction Treaty (START), signed between the United States and the former Soviet Union in Moscow, July 31, 1991, if ratified and implemented, will lead to major reductions in the deployments of strategic nuclear arms of the two largest nuclear powers. Equally important, it will put in place a comprehensive system of notifications, data exchanges, cooperative measures, and on-site inspections that, combined with national technical means (NTM), are expected to add to the confidence that the parties will have in their abilities to verify the reduced deployments called for in the treaty. The treaty limits the number of strategic nuclear delivery vehicles-intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and heavy bombers-of each party to 1,600 after a seven-year balanced reduction period. The total number of accountable, deployed nuclear warheads is limited to 6,000 for each party. The total number of warheads on ballistic missiles is limited to 4,900 for each side. A reduction of deployed, heavy ICBMs (namely, Soviet SS-18s) from 308, with 3,080 warheads, to 154, with 1,540 warheads, together with other prohibitions, sublimits, and counting rules, was designed to reduce the number of most threatening deployments capable of a first strike. The aggregate missile throw-weight is limited to 3,600 metric tons, and mobile-missile deployments are limited to restricted areas, further limiting surprise attack.

3502 Proliferation

31193 (DOE/DP–0097T) **1992 DOE Defense Critical Technologies Plan.** USDOE, Washington, DC (United States). 15 Mar 1992. 126p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019753. Source: OSTI; NTIS; GPO Dep.

The purpose of the Department of Energy's Defense Critical Technologies Plan is twofold: (1) to describe the technologies considered essential for maintaining confidence in the US nuclear deterrent and our ability to respond to nuclear threats, and (2) to outline a science and technology investment strategy to manage and develop these technologies in the political environment of a rapidly changing world. The Plan distinguishes between "Core Competencies" and "Critical Technologies." Science and technology efforts that comprise the nuclear weapon Core Competencies are fundamental to achieving continued confidence in the current stockpile and to improving the reliability, safety, security, and durability of our nuclear weapons deterrence. They also impact the manufacturing techniques of future nuclear weapons, which must focus on placing minimal stress on the environment and on worker health and safety. The Critical Technologies are the leading edge of the DOE defense research and advanced technology program. These Critical Technologies are likely to set the pace of US capability in the design, production, and maintenance of our strategic nuclear weapons stockpile. They sustain, in addition, other DOE missions that impact national defense, such as verification, arms control, and nonproliferation.

31194 (UCRL-ID–109684) **Nuclear employment policy and optimal exchange strategies.** Reinhardt, G.C. Lawrence Livermore National Lab., CA (United States). Sep 1991. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92040426. Source: OSTI; NTIS; GPO Dep.

This paper investigates the implications of strategic force reductions on stability using some US force postures suggested by Leon Sloss. Previous work has indicated that if force vulnerabilities exist, arms reduction can erode prevenient stability. This same conclusion applies here. The possible cost of non-optimal strategic weapons employment options was also studied by comparing analytically the outcome of optimal strategic exchanges as computed by the EXCHANGE code with selected limited strike options and their results. The analysis raises doubt as to the utility of less-than-optimal nuclear options if strategic forces are vulnerable.

3503 Verification

Refer also to citation(s) 31192, 32017

31195 (ANL/CP–75530) **Constitutional and legal implications of arms control verification technologies.** Tanzman, E.A.; Haffenden, R. Argonne National Lab., IL (United States). [1992]. 11p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. Contract DNA001-0-C-0177. (CONF-9206179–4: Arms control and verification technology, Williamsburg, VA (United States), 2-4 Jun 1992). Order Number DE92018794. Source: OSTI; NTIS; GPO Dep.

United States law can both help and hinder the use of instrumentation as a component of arms control verification in this country. It can foster the general use of sophisticated verification technologies, where such devices are consistent with the value attached to privacy by the Fourth Amendment to the United States Constitution. On the other hand, law can hinder reliance on devices that cross this constitutional line, or where such technology itself threatens health, safety, or environment as such threats are defined in federal statutes. The purpose of this conference paper is to explain some of the lessons that have been learned about the relationship between law and verification technologies in the hope that law can help more than hinder. This paper has three parts. In order to start with a common understanding, part I will briefly describe the hierarchy of treaties, the Constitution, federal statutes, and state and local laws. Part 2 will discuss how the specific constitutional requirement that the government respect the right of privacy in all of its endeavors may affect the use of verification technologies. Part 3 will explain the environmental law constraints on verification technology as exemplified by the system of on-site sampling embodied in the current Rolling Text of the Draft Chemical Weapons Convention.

31196 (BNL–47088) **The IAEA system and experience as a model for information Management under the Chemical Weapons Convention.** Bieber, A.M. Jr.; Kempf, C.R. Brookhaven National Lab., Upton, NY (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (TSO–92-12;CONF-9207102–54: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92019412. Source: OSTI; NTIS; GPO Dep.

Similarities in the verification aims of the monitoring regimes of the future Organization for the Prohibition of chemical Weapons (OPCW) and of the International Atomic Energy Agency (IAEA), make their general data requirements similar: data are needed for planning inspections, for evaluating inspections, and for preparation of reports on compliance with the relevant treaty In this paper we discuss the legal, procedural and administrative structure behind the data system associated with IAEA safeguards, and, after comparing this to the CWC regime, suggest possible improvements for consideration during the development of national implementation programs and of the declaration and inspection data management system for the OPCW.

31197 (LA–12350) **INF and IAEA: A comparative analysis of verification strategy: [Final report].** Scheinman, L. (Cornell Univ., Ithaca, NY (United States)); Kratzer, M. Los Alamos National Lab., NM (United States). Jul 1992. 88p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92018580. Source: OSTI; NTIS; INIS; GPO Dep.

This is the final report of a study on the relevance and possible lessons of Intermediate Range Nuclear Force (INF) verification to the International Atomic Energy Agency (IAEA) international safeguards activities.

36 MATERIALS

Refer also to citation(s) 31285, 31346, 31351

3601 Metals and Alloys

Refer also to citation(s) 30653, 30704, 30878, 30941, 30948, 30983, 30996, 31020, 31036, 31126, 31127, 31143, 31262, 31270, 31358, 31360, 31363, 31406, 31419, 31610, 32055, 32061, 32364, 32388, 32441, 32450, 32451, 32466, 32467, 32470

31198 (AAA-REP–88-2) **Model for blast furnace on-line simulation. Part 4: Application of the model to prediction.** Saxen, H. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1988. 45p. Order Number DE92562969. Source: OSTI; NTIS.

A simulation model for the blast furnace is applied to predict the behavior of the process under different operation actions. The model includes a set of parameters that is adapted to process data. The influence of the boundary conditions on the reaction rate parameter is considered in the predictions. A preliminary scheme for on-line prediction of the hot metal temperature is also outlined.

31199 (AAA-REP–91-1) **Model for predicting the evolution of steel temperature in a continuous casting tundish on the basis of expert knowledge.** Sillanpaeae, M. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1991. 71p. Order Number DE92562977. Source: OSTI; NTIS.

This work presents the basic principles used in an approach to predict the temperature of liquid steel in a continuous casting tundish on the basis of information of qualitative nature about the casting process. The approach has been chosen in order to meet the needs of an advisory system intended to support the initiation of the casting process. The steel temperature is considered an indicator of the potential casting difficulties that may be encountered during the casting. The casting difficulties have been distinguished into four classes on the basis of the temperature level at different time instants. The temperature is assumed to depend on seven major casting factors. Based on expert reasoning - partly available as a decision tree - the specific effect of each factor is categorized into a couple of classes with distinct quantitatively known impacts. An estimate of the temperature effects of the different factors in quantitative terms is obtained by formulating and solving an optimization problem. The temperature is calculated at a few central instants and compared with a target level specific for the expected casting difficulties. Levenberg-Marquardt's method has been used for minimization. The results can be utilized to estimate the evolution of the steel temperature in the casting process for different situations. Some aspects of class discretization are also briefly discussed.

31200 (ANL/CP–74687) **Weak-beam imaging of dissociated dislocations in HVEM-irradiated Fe-Ni-Cr alloys.** King, S.L. (Oxford Univ. (United Kingdom). Dept. of Materials); Jenkins, M.L.; Kirk, M.A.; English, C.A. Argonne National Lab., IL (United States). Jun 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920970–2: 3. conference on evolution of microstructure in metals during irradiation, Minett (Canada), 29 Sep - 2 oct 1992). Order Number DE92019587. Source: OSTI; NTIS; GPO Dep.

We report here on studies by weak-beam electron microscopy of the evolution of microstructures at and near preexisting line dislocations in a number of Fe-Ni-Cr alloys under electronirradiation in a high-voltage electron microscope (HVEM). The detailed observations are discussed in terms of dislocation climb mechanisms in these materials and a model based on interstitial pipe diffusion.

31201 (ANL/CP–74789) **Influence of dilute impurities on the evolution of defect cascades in nickel.** Vetrano, J.S. (Pacific Northwest Lab., Richland, WA (United States)); Robertson, I.M.; Kirk, M.A. Argonne National Lab., IL (United States). Apr 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38 ;FG02-91ER45439. (CONF-920970–4: 3. conference on evolution of microstructure in metals during irradiation, Minett (Canada), 29 Sep - 2 oct 1992). Order Number DE92019585. Source: OSTI; NTIS; GPO Dep.

We have employed transmission electron microscopy to study the formation of vacancy dislocation loops from defect cascades produced by a 50 key Kr^+ ion irradiation of Ni and its dilute alloys with Si and Al. An unusual and reproducible dependence of the loop collapse probabilities and loop size distributions on solute content was found. The results are explained by impurity caused changes in both the collisional and thermal spike (molten zone) phase of the defect cascade. Specific mechanisms include disruption of focussons by impurities to change the energy density profile within the collision cascade, interruption of replacement collision sequences, and interstitial trapping to reduce recombination during the thermal spike phase. Applying these mechanisms to a statistical distribution of the spatial extent of cascades and to the melt-zones, all the experimental observations can be explained.

31202 (ANL/CP–74791) **A study of the vacancy loop formation probability in Ni-Cu and Ag-Pd alloys.** Smalinskas, K. (Illinois Univ., Urbana, IL (United States). Dept. of Materials Science and Engineering); Chen, Gengsheng; Haworth, J.; Robertson, I.M.; Kirk, M.A. Argonne National Lab., IL (United States). Apr 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920970–3: 3. conference on evolution of microstructure in metals during irradiation, Minett (Canada), 29 Sep - 2 oct 1992). Order Number DE92019584. Source: OSTI; NTIS; GPO Dep.

The molten-zone model of vacancy loop formation from a displacement cascade predicts that the loop formation probability should scale with the melting temperature. To investigate this possibility the vacancy loop formation probability has been determined in a series of Cu-Ni and Ag-Pd alloys. The irradiations were performed at room temperature with 50 keV Kr+ ions and the resulting damage structure was examined by using transmission electron microscopy. In the Cu-Ni alloy series, the change in loop formation probability with increasing Ni concentration was complex, and at low- and high- nickel concentrations, the defect yield did not change in the predicted manner. The defect yield was higher in the Cu-rich alloys than in the Ni-rich alloys. In the Ag-Pd alloy the change in the loop formation probability followed more closely the change in melting temperature, but no simple relationship was determined.

31203 (ANL/CP–76480) **Experimental studies of cascade phenomena in metals.** Jenkins, M.L. (Oxford Univ. (United Kingdom). Dept. of Materials); Kirk, M.A.; Phythian, W.J. Argonne National Lab., IL (United States). Jun 1992. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Grant ABR 40029. (CONF-920970–1: 3. conference on evolution of microstructure in metals during irradiation, Minett (Canada), 29 Sep - 2 oct 1992). Order Number DE92019586. Source: OSTI; NTIS; GPO Dep.

We review recent ion-irradiation experiments which have been performed to investigate the collapse of displacement cascades to dislocation loops in a range of metals and alloys. Many of the results including the dependencies of the collapse probabilities on irradiation temperature, and ion dose, energy and mass, can be explained within the framework of a thermal spike/cascade melting model which has been suggested by computer molecular dynamics simulations. Other aspects, such as the dependence of collapse propabilities on the crystal structure and the effects of alloying and impurities, are less well understood.

31204 (ANL/CP–76649) **Thermodynamic analysis of phase equilibria in the iron-zirconium system.** Pelton, A.D. (Ecole Polytechnique, Montreal, PQ (Canada)); Leibowitz, L.; Blomquist, R.A. Argonne National Lab., IL (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920887–1: 8. international symposium on thermodynamics of nuclear materials, Snowbird, UT (United States), 16-21 Aug 1992). Order Number DE92019040. Source: OSTI; NTIS; INIS; GPO Dep.

Continuing interest in development of metallic fuels for nuclear reactors has prompted an examination of the phase relations of many of the relevant binary and ternary systems of interest. We performed a thermodynamic analysis and optimization of the Fe-Zr system. Overall reasonably good agreement was found with published diagrams, but some significant changes were required to ensure thermodynamic consistency.

31205 (CEA-CONF–10838) **Study of zirconium/stainless steel interface in tubular junctions made by eutectic diffusion.** Blanc, J.Y.; Le Goff, R.; Regnier, P. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Mecanique et de Technologie. 1990. 4p. (CONF-901107–: 9. American Society for Testing and Materials (ASTM) international symposium on zirconium in the nuclear industry, Kobe (Japan), 5-8 Nov 1990). Order Number DE92566720. Source: OSTI; NTIS (US Sales Only); INIS.

Reprocessing plants and pressurized water loops for fuels irradiation have zirconium (or zircaloy) and austenitic stainless steel tubes connected by mean of diffusion bondings. These bondings are achieved by producing an eutectic film at the interface between both metals, through a heat treatment up to the eutectic melting temperature (typ. 3 to 7 min at about 1020 deg C or more). To limit the unavoidable inherent brittleness of intermetallic compounds, the tubes are given a conical shape at the bound, where stainless steel is always the female part. This particular shaping accommodates the difference between coefficients of thermal expansion of both materials, and improves as well the mechanical strength of the joint, otherwise somewhat weaker. After a brief description of manufacturing process, essentially done in a vacuum medium frequency induction heating furnace, utilizations of such eutectic bondings are described. This paper emphasizes the metallurgical examination of the interface between zirconium and AISI 316 L stainless steel.

31206 (CEA-CONF–10943) **Determination of a crystalline orientation distribution function based on inverted poles figures principle for hexagonal crystalline symmetry. Macroscopic physical properties prediction.** Bechade, J.L. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Technologies Avancees. 1992. 10p. (In French). (CONF-9204192–: X-ray Colloquium, Saint-Denis (France), 6-10 Apr 1992). Order Number DE92566631. Source: OSTI; NTIS (US Sales Only); INIS.

Owing to crystal intrinsic anisotropy, hexagonal materials, such as zirconium alloys, show a texture strongly bound to the thermomechanical treatments. Their physical and mechanical properties depend partially of the preferential crystal orientations in the polycrystal. From X-ray diffraction measurements and from inverse pole figures, crystalline orientations distribution function allow to calculate - for any direction - KEARNS factors, thermal expansion and YOUNG modulus.

31207 (CEA-CONF–10944) **Effect of a sustained load and a low loading rate on 16 MND5 steel ductile tearing resistance.** Soulat, P. (CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux); Houssin, B. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux. 1992. 4p. (In French). (CONF-9204191–: French-Spanish Conference on Fracture Mechanic, Aiguablava (Spain), 1-3 Apr 1992). Order Number DE92566630. Source: OSTI; NTIS (US Sales Only); INIS.

The purpose of this study was to evaluate the possible degradation of the fracture toughness parameters in PWR service conditions by various factors such as loading rate and pressurized hot water environment. For that, tests on CT specimens with sustained load and low loading rates were made on a SA 508C13 steel with high sulfur content, in the aim to have a maximum of susceptibility. The results show that the usual J-R curve determinations in air at higher loading rate are applicable to the crack initiation and propagation in service conditions. 8 refs., 5 figs.

31208 (CEA-CONF–10945) **A new method for residual stress distribution - analysis of corroded zircaloy-4 cladding.** Godlewski, J.; Cadalbert, R. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux. 1992. 9p. (CONF-9203185–: International Symposium on Material Chemistry in Nuclear Materials, Tsukuba (Japan), 12-13 Mar 1992). Order Number DE92566629. Source: OSTI; NTIS (US Sales Only); INIS.

An X-ray diffraction method for residual stress measurement is developed to determine the stress level in the metal near the metal/oxide interface of Zircaloy-4 cladding samples oxidized in steam water at 400 deg C under a pressure of 10.3 MPa. The stress gradient is obtained and the evolution of the average stress is determined as a function of the oxidation time. The presence of tetragonal zirconia phase in quite large quantity near the metal/oxide interface could be correlated to the high stress level in the base metal, adjacent to the interface. 12 refs., 5 figs., 1 tab.

31209 (CEA-CONF–10969) **Development of a local approach for the intergranular fracture in low alloy steels.** Marini, B. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Technologies Avancees); Kantidis, E.; Soulat, P.; Houssin, B. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Technologies Avancees. 1992. 12p. (CONF-9204194–: Symposium on the Promotion of the Application of local Fracture/Damage Models to Engineering Fracture Problems, Tempe, AZ (United States), 28 Apr - 1 may 1992). Order Number DE93701049. Source: OSTI; NTIS (US Sales Only); INIS.

The intergranular fracture of a Mn-Ni-Mo low alloy steel is investigated through the local approach of brittle fracture developed by F.M. Beremin. A heat of a A 508 Cl3 type steel was chosen to study the intergranular fracture associated with cleavage fracture. Specimens were cut in order to contain ghost lines which have been revealed by sulphur prints before cutting. The critical stress derived from tests of axisymetric notched tension specimens exhibits a large scatter leading to a Weibull modulus of 10. In order to produce the pure intergranular type of fracture, a A 533 type steel with a phosphorus content of 170 ppm has been embrittled by special heat treatments. The application of the F.M. Beremin model leads to values of the Weibull modulus similar of those found on the segregated specimens tested in the first part of the study. An interpretation of these results is that the intergranular fracture mode should determine the values and the scatter of the critical stress of the mixed intergranular-cleavage mode of failure. 5 refs., 12 figs., 6 tabs.

31210 (CEA-R–5576) **The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria.** Ferrante, V. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux; Universite de Technologie de Compiegne, 60 (France). Dec 1991. 163p. (In French). Order Number DE92566619. Source: OSTI; NTIS (US Sales Only); INIS.

Although the ability of sulfate-reducing bacteria to enhance the corrosion of steel is now widely accepted, the actual processes involved in such phenomena are still discussed. This work is dedicated to the study of the exact roles played in corrosion processes firstly, by the presence of D. vulgaris cells and, secondly, by chemical factors such as the material composition and the accumulation of sulfide ions in the solution. The use of microbiological, electrochemical and analytical experimental techniques lead to results that show the interdependence of the bacteria and the material as well as the importance of the steel composition in the adhesion of the micro-organisms and the general corrosion rates. The bacteria cells and dissolved sulfide ions do not markedly influence the general corrosion rates. They however induce surface state modifications that can result in localized corrosion phenomena.

31211 (CEA-R-5581) **9Cr-1Mo martensitic alloys: effects of the nitrogen, niobium and vanadium additions on the microstructure, phase transformations and mechanical properties.** Brachet, J.C. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux; Paris-11 Univ., 91 - Orsay (France). Jun 1991. 240p. (In French). Order Number DE92566620. Source: OSTI; NTIS (US Sales Only); INIS.

9Cr - 1Mo martensitic steels are leading candidate materials for fast reactor sub-assembly wrapper applications. The microstructure, phase transformations and mechanical properties of five 9Cr1Mo alloys containing N, Nb and/or V have been studied by dilatometry, optical and electron transmission microscopy and microanalysis.

31212 (CNIC-00411) **A new corrosion testing facility with heat flux caused surface boiling conditions.** Tian Baiyuan (Shanghai Nuclear Engineering Research and Development Inst., SH (China)); Lu Darong; Zhou Mingyao; Ding Yaping; Xu Xuelian; Wang Cunren. China Nuclear Information Centre, Beijing, BJ (China). Jul 1990. 15p. (In Chinese). (NERDI-0015.). Order Number DE93601350. Source: OSTI; NTIS (US Sales Only); INIS.

The wall thickness of heat transfer tube of the steam generator used in nuclear power plant is rather thin and tubes work under very severe conditions. Therefore, tubes cracking owing to corrosion is common. A new corrosion testing facility with heat flux caused surface boiling conditions provides a powerful tool in studying the stress corrosion cracking of tubes under real working conditions and finding solutions of protecting tubes from stress corrosion. The facility can be used to screen heat transfer tubes with different materials and processing technologies relating to their corrosion properties. It also can be used to simulate properties of anti-stress corrosion cracking with local boiling and concentrating working conditions in a steam generator, to study local corrosion cracking of tubes located at areas sensitizing to corrosion, to determine the tolerable limit of Cl^- and NaOH concentration in the secondary circuit water and to workout the safety standard of water quality for a nuclear power plant. The facility with simulating working conditions of tubes in the steam generator is much better than static autoclave. It is closer to the real working conditions. Comparing with the mockup testing, it has many advantages such as simple, exquisite, less cost, easy to build and operate and more efficient.

31213 (CNIC-00539) **Improving the properties of stainless steel electron-beam welds by laser treatment.** Wu Xueyi (Southwest Material Inst., SC (China)); Zhou Changchi. China Nuclear Information Centre, Beijing, BJ (China). Oct 1991. 12p. (In Chinese). (SMI-0004.). Order Number DE93601327. Source: OSTI; NTIS (US Sales Only); INIS.

For improving the properties of corrosion resistance of stainless steel, which is widely used in nuclear engineering, the technological test on rapid fusing and setting formed by using laser treatment in electron-beam welds on stainless steel was investigated and the analytical results of welding structure and properties were reported. The experimental results show that after laser treatment more fine-grained structure in the surface of the welding centreline and welding heat-affected zone was observed. Segregation of chemical composition was reduced. Plasticity and corrosion resistance in the welding zone was increased. Intergranular corrosion of heat-affected zone was improved.

31214 (CNIC-00542) **Neutron irradiation test of the S271 steel.** Gao Weisen (China Nuclear Power Inst., Chengdu, SC (China)); Yang Mingjin; Li Manchang; Cui Yonghai; Zhang Chunhua. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 6p. (In Chinese). (SINRE-0033.). Order Number DE93601363. Sourçe: OSTI; NTIS (US Sales Only); INIS.

The irradiation test of the S271 produced by the Heavy Machinery Plant of Shanghai has been tested in the High Flux Engineering Test Reactor (HFETR). The neutron irradiation brittleness of the steel was examined by Charpy impact toughness test and room temperature tensile test. The transition temperature increase and upper shelf energy (USE) decrease were determined. The test results showed that after 3×10^{19} n/cm^2 neutron irradiated at 288 deg C, the increase of brittleness transition temperature for T x T/4 samples was 41 ≈ 43 deg C. The irradiation brittleness for the tube material of water supply pipe in the longitudinal direction is smaller than in the tangential direction. The USE of all three samples are greater than 160.

31215 (CONF-920305-14) **Ordering energies and mechanisms in β-phase NiAl.** Stocks, G.M. (Oak Ridge National Lab., TN (United States)); Nicholson, D.M.; Shelton, W.A.; Geist, G.A.; Pinski, F.J.; Ginatempo, B.; Barbieri, A.; Gyoerffy, B.L.; Sluiter, M.; Turchi, P.E.; Szotek, Z.; Temmerman, W.M. Oak Ridge National Lab., TN (United States). [1992]. 19p. Sponsored by USDOE, Washington, DC (United States); Consiglio Nazionale delle Ricerche, Rome (Italy). DOE Contract AC05-84OR21400. From Minerals, Metals, and Materials Society (TMS) annual meeting and exhibition; San Diego, CA (United States); 1-5 Mar 1992. Order Number DE92040031. Source: OSTI; NTIS; GPO Dep.

We review calculations of the ordering energies of $Ni_cAl_{(1-c)}$ alloys based on the generalized perturbation method and the KKR-CPA. First principles KKR-CPA calculations of ordering energies of beta phase $Ni_cAl_{(1-c)}$ alloys as a function of the long range order parameter are presented. We also show alloy Fermi surfaces in β-phase $Ni_{0.625}Al_{0.375}$ that support a recent suggestion that the phonon anomalies observed in neutron scattering experiments are driven by Fermi surface nesting.

31216 (CONF-9206234-1) **Oxidation-sulfidation behavior of iron alloys containing 16 to 40 atomic percent aluminum.** DeVan, J.H.; Tortorelli, P.F. Oak Ridge National Lab., TN (United States). [1992]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From International conference on advances in corrosion and protection; Manchester (United Kingdom); 28 Jun 1992. Order Number DE92017824. Source: OSTI; NTIS; GPO Dep.

Iron aluminide alloys containing 16–40 at.% aluminum and 0–5 at.% chromium were tested in H_2S-H_2-H_20 gas mixtures at 800°C and in air at 800–1000°C. Results were compared with those for developmental Fe-Cr-Al alloys. Alloys containing 18% or more aluminum were highly resistant to H_2S-H_2-H_20 gas mixtures, and the corrosion behavior did not change significantly with aluminum concentrations above 18%. A 20 at.% Al level was found to be critical for sustained oxidation resistance of binary Fe-Al alloys in air at 900°C and above. However, the addition of 5 at.% Cr at the 16 at.% Al level reduced the oxidation rate in air to that of alloys containing $\geq$20% Al. Corrosion rates of iron aluminides were comparable to $\overline{F}$e-Cr-Al alloys in air but were significantly lower than Cr-containing alloys in H_2S-H_2-H_20. The respective corrosion processes operative for iron aluminides in mixed gas and air are discussed in terms of the observed alloying effects.

31217 (CONF-9206238-1) **Ingot homogenization.** Jennings, T.L. Jr. (Georgia Inst. of Tech., Atlanta, GA (United States)); Sanders, T.H. Jr.; Henson, T.J. Oak Ridge National Lab., TN (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 3. international conference on aluminium alloys, their physical & mechanical properties; Trondheim (Norway); 22-26 Jun 1992. Order Number DE92019181. Source: OSTI; NTIS; GPO Dep.

Coring is a common phenomenon that occurs during solidification of cast metals; it is a continuous variation in composition of the matrix that leads to non-equilibrium phases. Coring occurs in all alloy systems providing the alloy freezes over a range in temperatures. In the case of a solidifying binary hypo-eutectic system, such as Al-Cu or Al-Si, dendrites of primary aluminum form which have increasing amounts of solute from the center of the dendrite to their edges. The last liquid to solidify in the interdendritic channels is of eutectic composition. Although the sequence of events occurring in the Al-Cu and Al-Si systems are similar, the morphologies of the non-aluminum phases in the two eutectics are different. The purpose of this research was to investigate the influence of particle morphology on ingot homogenization kinetics. Two systems were investigated - Al-Cu and Al-Si. These two systems represent extremes in the nature of the interface of the non-aluminum second phase.

31218 (CONF-9209174-1) **Shallow-crack toughness results for reactor pressure vessel steel.** Theiss, T.J. (Oak Ridge National Lab., TN (United States)); Shum, D.K.M.; Rolfe, S.T. Oak Ridge National Lab., TN (United States). [1992]. 11p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC05-84OR21400. From International conference on shallow crack fracture mechanics tests and applications; Cambridge (United Kingdom); 26 Sep 1992. Order Number DE92017813. Source: OSTI; NTIS; INIS; GPO Dep.

The Heavy Section Steel Technology Program (HSST) is investigating the influence of flaw depth on the fracture toughness of reactor pressure vessel (RPV) steel. To complete this investigation, techniques were developed to determine the fracture toughness from shallow-crack specimens. A total of 38 deep and shallow-crack tests have been performed on beam specimens about 100 mm deep loaded in 3-point bending. Two crack depths ($a \approx 50$ and 9 mm) and three beam thicknesses ($B \approx 50$, 100, and 150 mm) have been tested. Techniques were developed to estimate the toughness in terms of both the J-integral and crack-tip opening displacement (CTOD). Analytical J-integral results were consistent with experimental J-integral results, confirming the validity of the J-estimation schemes used and the effect of flaw depth on fracture toughness. Test results indicate a significant increase in the fracture toughness associated with the shallow flaw specimens in the lower transition region compared to the deep-crack fracture toughness. There is, however, little or no difference in toughness on the lower shelf where linear-elastic conditions exist for specimens with either deep or shallow flaws. The increase in shallow-flaw toughness compared with deep-flaw results appears to be well characterized by a temperature shift of 35°C.

31219 (CONF-921036-5) **The nature of scales grown on binary Cr-Nb alloys.** Tortorelli, P.F.; DeVan, J.H. Oak Ridge National Lab., TN (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 182. meeting of the Electrochemical Society; Toronto (Canada); 11-16 Oct 1992. Order Number DE92019283. Source: OSTI; NTIS; GPO Dep.

The nature of the scales formed on Cr-Cr_2Nb alloys was studied for exposures to air at 900 and 950°C. The kinetics, scale composition, and spallation tendencies of Cr -6 and -12 at. % Nb alloys were characterized. Multilayer scales with a pure chromia outer layer were formed, and the alloy with the higher niobium content performed significantly better in terms of overall weight gain and resistance to spallation. This behavior was ascribed to an increased volume fraction of the Cr_2Nb-Cr eutectic mixture at the expense of the Cr-rich phase.

31220 (DOE/CE-0358P) **Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Annual report, Fiscal Year 1991.** USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Office of Industrial Processes. Apr 1992. 32p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019275. Source: OSTI; NTIS; GPO Dep.

The Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 was signed into law on November 17, 1988. This Act, Public Law 100-680, has the following purposes: (1) to "increase the energy efficiency and enhance the competitiveness of American steel, aluminum, and copper industries···"; and (2) to continue the research and development efforts begun under the Department of Energy (DOE) program known as the Steel Initiative. Public Law 100-680 requires the Secretary of Energy to prepare and submit annually to Congress a report of the activities carried out under that Act during each fiscal year. During FY 1991 research and development activities were continued on the following projects: (1) superplastic steel processing with Lawrence Livermore National Laboratory; (2) spray-forming of steel at Idaho National Engineering Laboratory, Oak Ridge National Laboratory, and Massachusetts Institute of Technology; (3) direct steelmaking with the American Iron and Steel Institute; and (4) wettable cathodes for alumina reduction cells with the Reynolds Metals Company. Activities relating to these four projects and the value of the industrial cost-sharing for each project are presented in this annual report. Also included are the appropriations history, the actual obligation of funds through FY 1991, and the anticipated obligation of funds necessary to continue these and the other projects initiated in FY 1991. In accordance with the requirements of the Act for FY 1991, a summary of activities under the management and research plans, plus an analysis of the extent to which these activities have succeeded in accomplishing the purposes of the Act, has been included.

31221 (DOE/ER/14220-1) **Mixing and settling in continuous metal production: Progress report, September 15, 1991–May 31, 1992.** Richter, H.J. Dartmouth Coll., Hanover, NH (United States). Thayer School of Engineering. Jun 1992. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER14220. Order Number DE92040341. Source: OSTI; NTIS; GPO Dep.

Modern metallurgical converters are operated in the horizontal mode to permit staging of bath oxygen potential by utilizing bottom-blowing of oxygen and fuel. The submerged injectors must provide sufficient turbulence to maximize heat and mass transfer in the bath but must be selectively localized so as to provide adequate phase separation zones between the active turbulent zones. A test facility has been built to study gas injection into a bath simulating such a converter and instrumentation such as flow meters and a Laser Doppler Velocimeter were installed. Further instrumentation such as a resistivity probe to measure void fraction is under construction. First experimental results are available and numerical modelling of the simplest case were completed successfully.

31222 (DOE/ER/45320-5) **Studies of the III-V compounds in the megabar regime: Technical progress report.** Ruoff, A.L. Cornell Univ., Ithaca, NY (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER45320. Order Number DE92019517. Source: OSTI; NTIS; GPO Dep.

In this project we develop techniques for making high pressure measurements (x-ray diffraction and optical measurements) on samples in the multimegabar regime and we make systematic studies of the crystal structure of III-V compounds and other materials as a function of pressure with the broad objective of providing experimental data over a broad range of coordination number and interatomic spacing which can play a leading role in the testing and development of theoretical models of binding.

31223 (DOE/NBM-92001256) **Wastage-resistant FBC evaporator tubing through microalloying.** Witherell, C.E. Lawrence Livermore National Lab., CA (United States). Oct 1991. 75p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (UCRL-CR-109002). Order Number DE92001256. Source: OSTI; NTIS; GPO Dep.

This phase of the LLNL study of wastage of carbon steel evaporator tubing in fluidized-bed coal combustors (FBC) of the bubbling-bed type focused upon leads uncovered during the previous phase suggesting that trace-element residuals in the tubing steel influenced wastage response. Experimental steels of controlled compositions, but simulating commercial steelmaking practices, were prepared within several elements indicated to be important in these respects were varied independently. This initial series showed that additions of some of these elements, principally aluminum, nickel, and copper – when present singly – improved scale adhesion in room temperature bend tests. In a second series of experimental steels, aluminum additions significantly decreased elevated temperature indentation hardness, even with co-present residuals of chromium, nickel, and copper. Steels of the same series having combined residuals of aluminum, chromium, nickel, and copper had improved resistance to scale exfoliation in room temperature bend tests over steels without these trace-elements.

31224 (DPW-5189) **T metal analytical samples.** Hayes, E.E. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Atomic Energy Div. 18 Apr 1952. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H-183). Order Number DE92040196. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Short communication ALLOYS/chemical analysis; ALLOYS; RARE EARTHS; OXYGEN; ALUMINIUM; SILICON; BERYLLIUM

31225 (ECN-I-91-034) **Neutron metrology in the HFR: Steel irradiation R139-584/585/586.** Baard, J.H.; Voorbraak, W.P.

Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 34p. Order Number DE93601365. Source: OSTI; NTIS; INIS.

The experiment R-139-58 for investigating the stainless steel type 316-CL has been irradiated in the HFR Petten. This report presents the metrology results obtained from activation monitors in three specimen holders for the steel experiment R139-585/585/586. Data about the helium production as well as the number of displacements per atom are also included. The irradiation conditions for this experiment, carried out in a TRIO type capsule in the HFR position H8, are as close as possible to conditions of the EFR (European Fast Reactor) above core structure. The main results of the thermal and fast neutron fluence measurements are presented in table 1 and in figures 1-3. (author). 12 refs.; 4 figs.; 12 tabs.

31226 (ECN-I-91-060) **Neutron metrology in the HFR: Steel irradiation R139-587/588/589.** Ketema, D.J.; Voorbraak, W.P. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Oct 1991. 34p. Order Number DE93601366. Source: OSTI; NTIS; INIS.

The experiment R139-58, for testing the stainless steel type 316-CL, has been irradiated in the HFR Petten. This report presents the final metrology results obtained from activation monitors in 3 specimen holders (R139-587/588/589). Data about the helium production as well as the number of displacements per atom are also included. The irradiation conditions for this experiment, carried out in a TRIO type capsule in the HFR position H8, are as close as possible relevant for conditions of the EFR (European Fast Reactor) upper-core structures. Main results of the thermal and fast neutron fluence measurements are presented in table 1 and in figures 1-3. (author). 9 refs.; 3 figs.; 10 tabs.

31227 (ECN-RX-91-103) **Infrared spectra of the gaseous iodides of chromium, iron and nickel.** Konings, R.J.M. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Booij, A.S. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Nov 1991. 17p. Order Number DE93601351. Source: OSTI; NTIS; INIS.

Submitted to Journal of Molecular Structure.

The infrared spectra of the vapours over chromium, iron and nickel di-iodide have been studied by high-temperature infrared spectroscopy. The gaseous molecules CrI_2, FeI_2 and NiI_2 were all identified and the interpretation of the spectra is in agreement with a linear structure. Additional strong absorption bands in the spectra of the vapour phase above liquid CrI_2 and FeI_2 were assigned to dimeric $(MI_2)_2$ molecules. Valence force constants and thermodynamic quantities have been calculated. (author). 41 refs.; 4 figs.; 5 tabs.

31228 (EGG-M-91349) **The influence of processing atmosphere on twin-roll melt-spinning of aluminum alloys.** Sellers, C.H.; Aldrich, K.S.; Cortez, M.M.; Wright, R.N. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-920305-13: Minerals, Metals, and Materials Society (TMS) annual meeting and exhibition, San Diego, CA (United States), 1-5 Mar 1992). Order Number DE92017895. Source: OSTI; NTIS; GPO Dep.

Melt-spun samples of Al-2%Fe have been produced in two different processing atmospheres, ambient pressure argon and a high vacuum. High speed video photography and microstructural analysis of the ribbons indicate that the processing pressure influences the interaction of the melt with the copper rolls and thus the thermal history. This results in significant differences in ribbon microstructure.

31229 (IC-92/120) **Bifurcations and chaos in dislocation multiplication process.** Lung, C.W. (International Centre for Theoretical Physics, Trieste (Italy)); Wang, X.W. International Centre for Theoretical Physics, Trieste (Italy). Jun 1992. 14p. Order Number DE92643051. Source: OSTI; NTIS (US Sales Only); INIS.

The dynamical process of bifurcations and chaos in dislocation multiplication is studied. The possibility of this phenomenon to be observed is discussed. (author). 6 refs, 4 figs.

31230 (INIS-mf-13351) **Corrosion problems of materials for mechanical, power and chemical engineering: National conference.** Bouska, P.; Cihal, V.; Malik, K.; Vyklicky, M.; Stefec, R. (eds.). Slovenska Vedeckotechnicka Spolocnost, Bratislava (Czechoslovakia). Dom Techniky. 1988 100p. (In Czech, Slovak). (CONF-8809537-: National conference on corrosion problems of materials for mechanical, power and chemical engineering, Nitra (Czechoslovakia), 27 Sep 1988). Order Number DE93601352. Source: OSTI; NTIS (US Sales Only); INIS.

The proceedings contain 47 contributions, out of which 8 have been inputted in INIS. These are concerned with various corrosion problems of WWER primary circuit components and their testing. The factors affecting the corrosion resistance are analyzed, the simultaneous corrosion action of decontamination of steels is assessed, and the corrosion cracking of special steels is dealt with. The effects of deformation on the corrosion characteristics are examined for steel to be used in fast reactors. The corrosion potentials were measured for various steels. A testing facility for corrosion-mechanical tests is briefly described. (M.D.). 5 figs., 5 tabs., 25 refs.

31231 (IS-M-713) **Simulation of forward-backward extrusion with numerical and model material techniques.** Biner, S.B. Ames Lab., IA (United States). [1992]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-82. (CONF-921166-1: Conference on concurrent engineering approaches to materials processing, Chicago, IL (United States), 2 Nov 1992). Order Number DE92016299. Source: OSTI; NTIS; GPO Dep.

In this study, a simple and computationally efficient procedure is introduced for determination of the strain distribution during the simulations of forming processes using model material techniques. Forward-backward extrusion process is analyzed by using FEM and the model material techniques. The strain fields obtained from both methods compared favorably with each other. The advantages and the limitations of the techniques are elucidated together with suggested recommendations.

31232 (JINR-R-13-91-128) **Investigation of hydrogen permeability of protective coating for high-temperature alloy EI698.** Bystritskij, V.M. (and others); Voshedchenko, B.M.; Granovskij, V.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 16p. (In Russian). Order Number DE92643076. Source: OSTI; NTIS (US Sales Only); INIS.

Permeating fluxes are measured and activation energies are determined for the process of hydrogen permeation at the pressure of 98 MPa in the temperature range from 800 K to 1050 K through the walls of the samples made of high-temperature alloy with different types of protective coating. Stability of protective coating at the hydrogen pressure of 98 MPa and at temperatures 1000 K and 1050 K investigated. 20 refs.; 6 figs.; 1 tab.

31233 (KCP-613-4901) **Standards for burrs?.** Gillespie, L. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Jul 1992. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019983. Source: OSTI; NTIS; GPO Dep.

This document contains a standard for burrs and deburring and an informational section. This is a voluntary standard, designed to convey edge quality expectations in the absence of any other definition. The informational section provides some rationale and insight into the impact of certain choices. The removal of burrs, rendering them more functional, and smoothing of edges are all often jointly referred to as "deburring" or "burring." The term "edge finishing" is also used to describe the actions just mentioned. The degree of burr removal and edge finishing necessary for assembly and later use varies greatly among products and industries. The size, location, and properties of burrs similarly can vary widely between products and materials and even on the same product. Included are degrees of edge finishing that should be used when describing desired edge qualities.

31234 (KFK-4994) **Experiments to study the erosive effect of oxide casting streams on structures.** Stuka, B.; Knauss, H.; Kammerer, B.; Perinic, D. Kernforschungszentrum Karlsruhe

GmbH (Germany). Hauptabteilung Ingenieurtechnik; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Apr 1992. 115p. (In German). Order Number DE93702475. Source: OSTI; NTIS (US Sales Only); INIS.

The experiments performed under an activity of the Nuclear Safety Project (PSF) make a contribution to the study of the erosive effect of oxide casting streams on structures. As aluminothermically generated oxide casting stream, 20 mm in diameter, was applied from 1.0 m dropping height to 40 mm thick horizontal stainless steel plates in free air atmosphere. The test parameters were different temperatures of preheating of the plates (900 and 1200deg C). By means of thermocouples offset in depth in the plates it was possible to record and represent the temperature distribution in the plate correlated with time. Regarding the direct erosive effect of an oxide casting stream as a function of the temperature of plate preheating it appeared that a high initial temperature of the stainless steel plate (1200deg C) causes an increased erosion area at the surface only, but does not exert a macroscopically visible influence on erosion depth. (orig.).

31235 (LA-UR–92-2400) **Is there a unique effective interaction profile for dislocations?.** Kocks, U.F. (Los Alamos National Lab., NM (United States)); Chen, Shuh Rong; Mecking, H. Los Alamos National Lab., NM (United States). [1992]. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206241–1: Z.S. Basinski international symposium on crystal plasticity, Kingston (Canada), 16 Jun 1992). Order Number DE92018615. Source: OSTI; NTIS; GPO Dep.

Thermal activation affects plastic flow in two ways: it lowers the stress for dislocations to cross each other; and it helps them to break loose from the high-energy configurations in which they are initially stored during strain hardening, which manifests itself in the phenomenon of dynamic recovery. It is shown that both effects may be described by a single effective dislocation interaction profile, the main difference being an additional strong internal driving force for recovery. The dependence of the effective activation energy on stress may be described by a surprisingly simple form. A single adjustable parameter, which scales with the normalized stacking-fault energy, may allow for this interaction profile to be universal, at least for fcc metals.

31236 (LA-UR–92-2510) **Experimentation and simulation of gravity fed lead castings.** Korzekwa, D.R.; Lewis, M.A.K.; Rollett, A.D.; Erickson, W.C.; Bryant, L. Jr. Los Alamos National Lab., NM (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921109–1: Fall meeting of The Metallurgical Society, Chicago, IL (United States), 1-5 Nov 1992). Order Number DE92018996. Source: OSTI; NTIS; GPO Dep.

Gravity fed load castings are analyzed both experimentally and numerically. Castings produced from various mold designs and crucible pour hole sizes are studied with Flash X-Ray Radiography to look at the mold filling and casting integrity. The same castings were also modeled using the commercial code FLOW-3D. Details of the fluid flow and the final structure are studied for both the experimental and numerical castings. This work also qualitatively compares flash x-ray radiographs with the simulations. FLOW-3D is in good agreement with the experimental work.

31237 (PNL-SA–19946) **Influence of cold work level on the irradiation creep and creep rupture of titanium-modified austenitic stainless steels.** Garner, F.A. (Pacific Northwest Lab., Richland, WA (United States)); Hamilton, M.L.; Eiholzer, C.R.; Toloczko, M.B.; Kumar, A.S. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920673–8: 16. annual symposium of American Society of Testing and Materials (ASTM), Denver, CO (United States), 21-22 Jun 1992). Order Number DE92019078. Source: OSTI; NTIS; GPO Dep.

A titanium-modified austenitic type stainless steel was tested at three cold work levels to determine its creep and creep rupture properties under both thermal aging and neutron irradiation conditions. Both the thermal and irradiation creep behavior exhibit a complex non-monotonic relationship with cold work level that reflects the competition between a number of stress-sensitive and temperature-dependent microstructural processes. Increasing the degree of cold work to 30% form the conventional 20% level was detrimental to its performance, especially for applications above 550°C. The 20% cold work level is preferable to the 10% level, in terms of both in- reactor creep rapture response and initial strength.

31238 (RFP–4450) **Calculation of binary phase diagrams between the actinide elements, rare earth elements, and transition metal elements.** Selle, J.E. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. 26 Jun 1992. 100p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. Order Number DE92019119. Source: OSTI; NTIS; INIS; GPO Dep.

Attempts were made to apply the Kaufman method of calculating binary phase diagrams to the calculation of binary phase diagrams between the rare earths, actinides, and the refractory transition metals. Difficulties were encountered in applying the method to the rare earths and actinides, and modifications were necessary to provide accurate representation of known diagrams. To calculate the interaction parameters for rare earth-rare earth diagrams, it was necessary to use the atomic volumes for each of the phases: liquid, body-centered cubic, hexagonal close-packed, and face-centered cubic. Determination of the atomic volumes of each of these phases for each element is discussed in detail. In some cases, empirical means were necessary. Results are presented on the calculation of rare earth-rare earth, rare earth-actinide, and actinide-actinide diagrams. For rare earth-refractory transition metal diagrams and actinide-refractory transition metal diagrams, empirical means were required to develop values for the enthalpy of vaporization for rare earth elements and values for the constant (C) required when intermediate phases are present. Results of using the values determined for each element are presented.

31239 (RFP–4581) **The effect of precipitate forming elements in Al 4.5% Mg alloys on the measured acoustic emission and on Lueders band deformation.** Armentrout, D.L. (Denver Univ., CO (United States). Dept. of Physics); Carpenter, S.H. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. (CONF-9210150–1: 11. international acoustic emission symposium, Fukuoka (Japan), 26-29 Oct 1992). Order Number DE92016864. Source: OSTI; NTIS; GPO Dep.

Acoustic emission (AE) was measured in A1 4.5% Mg alloys with varying amounts of additional elements which form precipitates in this system. During tensile testing, the samples deformed inhomogeneously with multiple yield points - often called Lueders bands. calculated strain rates during Lueders bands. Calculated strain rates during Lueders deformation were greater than $10\ s^{-1}$. Three distinct regions could be observed in close examination of the drop in stress associated with the yield points. The AE signal peak was found to occur during the region of steepest decrease in the stress. The magnitude of the stress drops which is proportional to the amount of plastic deformation in the individual yield points correlated well with the height of the corresponding rms voltage bursts.

31240 (SAND–91-2774C) **Elevated temperature tensile properties of borated 304 stainless steel: Effect of boride dispersion on strength and ductility.** Stephens, J.J.; Sorenson, K.B.; McConnell, P. Sandia National Labs., Albuquerque, NM (United States). [1991]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920905–5: 10. international symposium on the packaging and transportation of radioactive materials: PATRAM '92, Yokohama (Japan), 13-18 Sep 1992). Order Number DE92040096. Source: OSTI; NTIS; INIS; GPO Dep.

This paper has documented the increase in strain to fracture and yield strength obtained with Grade A versions of types 304B5 and 304B7 relative to their respective Grade B, counterparts. The apparent microstructural reason for these property increases is the finer dispersion of boride in the Grade A material, obtained by means of a Powder Metallurgy process, relative to the conventional Grade B material which is produced using an Ingot Metallurgy process. The area size distribution of borides can be well approximated using a log-normal distribution, with the largest boride particles in the Grade B material having areas in the range of 450–600 μm^2. By comparison, the largest boride particles in the Grade A material have areas nearly an order of magnitude smaller than the largest particles in their Grade B counterparts. A Section III ASME B&PV code case inquiry has been initiated for non-welded versions of 304B4A, 3045A and 3046A material.

31241 (SAND–92-1543C) **Numerical simulations of steel plate perforation.** Chen, E.P. Sandia National Labs., Albuquerque, NM (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921110–8: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92017058. Source: OSTI; NTIS; GPO Dep.

Numerical simulations of perforation in steel plates involve the treatment of material failure during the perforation process. One way to model physical material separation is to delete failed elements from the analysis based on an appropriate failure criterion. Different algorithms were used in different transient finite element codes to delete failed elements. This investigation compares the results of PRONTO 2D and LS-DYNA2D codes for a specific steel plate perforation problem. Influences of the deletion algorithms on material parameters are discussed.

31242 (SAND–92-1603C) **Thermodynamically consistent theories for elastoplasticity coupled with damage.** Hansen, N.R. (Sandia National Labs., Albuquerque, NM (United States)); Schreyer, H.L. Sandia National Labs., Albuquerque, NM (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921110–12: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92018283. Source: OSTI; NTIS; GPO Dep.

A framework for coupled elastoplastic and damage theories is developed, following a rigorous thermodynamic procedure. This framework is sufficiently general to include anisotropic plasticity and damage formulations. Both the plastic yield and damage functions are constructed using homogeneous functions of degree one. The principle of maximum dissipation or maximum entropy production is used to derive the evolution relations together with the loading and unloading conditions. In addition, the convexity of the undamaging elastic domain is shown. For plasticity the resulting evolution of the plastic strains corresponds to an associative flow. This general framework is shown to be sufficiently general to describe several popular theories for both plasticity and damage. Limitations of some existing damage theories are discussed.

31243 (UCID–20622-92-1) **Chemistry and Materials Science progress report, first half FY 1992: Weapons-Supporting Research and Laboratory Directed Research and Development.** Lawrence Livermore National Lab., CA (United States). Jul 1992. 90p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019905. Source: OSTI; NTIS; INIS; GPO Dep.

This report contains sections on: Fundamentals of the physics and processing of metals; interfaces, adhesion, and bonding; energetic materials; plutonium research; synchrotron radiation-based materials science; atomistic approach to the interaction of surfaces with the environment: actinide studies; properties of carbon fibers; buried layer formation using ion implantation; active coherent control of chemical reaction dynamics; inorganic and organic aerogels; synthesis and characterization of melamine-formaldehyde aerogels; structural transformation and precursor phenomena in advanced materials; magnetic ultrathin films, surfaces, and overlayers; ductile-phase toughening of refractory-metal intermetallics; particle-solid interactions; electronic structure evolution of metal clusters; and nanoscale lithography induced chemically or physically by modified scanned probe microscopy.

31244 (UCRL-JC–110360) **Silicide layer growth rates in Mo/Si multilayers.** Rosen, R.S.; Stearns, D.G.; Viliardos, M.A.; Kassner, M.E.; Vernon, S.P.; Cheng, Yuanda. Lawrence Livermore National Lab., CA (United States). Apr 1992. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9204120–3: Soft-x-ray projection lithography topical meeting, Monterey, CA (United States), 6-8 Apr 1992). Order Number DE92019581. Source: OSTI; NTIS; GPO Dep.

The thermal stability of sputter-deposited Mo/Si multilayers was investigated by annealing studies at relatively low temperatures (~ 250–350 °C) for various times (0.5–2000 h). Two distinct stages of thermally-activated interlayer growth were found: a primary "surge" of ~ 0.3 nm, followed by a (slower) secondary "steady-state" growth where the interdiffusion coefficient is constant. The interdiffusion coefficients for the interlayer formed by deposition of Mo-on-Si are 200 times greater than those of the interlayer formed by deposition of Si-on-Mo. The interdiffusion coefficient, $D_o \cong 100$ cm^2/s and apparent activation energy, $E_a \cong 2.5$ eV for the secondary stage of Mo-on-Si interlayer growth are comparable to values for diffusion of Si in h-$MoSi_2$.

3602 Ceramics, Cermets, and Refractories

Refer also to citation(s) 31038, 31095, 31143, 31229, 31242, 31321, 31610, 31615, 32381, 32387, 32391, 32476, 32479

31245 (ANL/CP–75064) **High-temperature deformation and diffusion in oxides.** Routbort, J.L. Argonne National Lab., IL (United States). Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209179–1: 2. Iketani international conference on diffusion in materials (DIMAT-92), Kyoto (Japan), 7-11 Sep 1992). Order Number DE92019593. Source: OSTI; NTIS; GPO Dep.

High-temperature, steady-state deformation is usually controlled by diffusion of the slowest moving ion along its fastest diffusion path. Therefore, measurements of steady-state deformation can, in principle, be used to obtain information concerning diffusion. This paper will briefly review the assumptions that relate creep, defect chemistry, and diffusion. Steady-state deformation of the NaCl-structured oxides, $Co_{1-x}O$ and $Mn_{1-x}O$, and the perovskite-structured high-temperature superconductors $YBa_2Cu_30_x$ and $Bi_2Sr_2CaCu_20_x$ will be discussed, emphasizing diffusion of the minority defects.

31246 (ANL/CP–76698) **Oxygen diffusion in high-T_c superconductors.** Rothman, S.J.; Routbort, J.L. Argonne National Lab., IL (United States). Jul 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209179–2: 2. Iketani international conference on diffusion in materials (DIMAT-92), Kyoto (Japan), 7-11 Sep 1992). Order Number DE92019597. Source: OSTI; NTIS; INIS; GPO Dep.

The cuprate superconductors are fascinating not only because of their technical promise, but also because of their structures, especially the anisotropy of the crystal lattice. There are some structural similarities among these compounds, but also significant differences. Measurements of the oxygen tracer diffusion coefficients have been carried out as a function of temperature, oxygen partial pressure, crystal orientation, and doping in the La-Sr-Cu-0, Y-Ba-Cu-0, and Bi-Sr-Ca-Cu-0 systems. These measurements have revealed a variety of defect mechanisms operating in these compounds; the exact nature of the mechanism depends on the details of the structure.

31247 (ANL/CP–76805) **Activation energy and critical current density in Bi-Sr-Ca-Cu-O.** Shi, Donglu; Sengupta, S.; Smith, M.; Wang, Z. Argonne National Lab., IL (United States). Jul 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920614–2: International cryogenic engineering conference and the international cryogenic materials conference, Kiev (Ukraine), 8-12 Jun 1992). Order Number DE92018795. Source: OSTI; NTIS; INIS; GPO Dep.

Flux creep in a Bi-Sr-Ca-Cu-0 system has been investigated in wide temperature and field regimes. Previously reported studies of the flux-creep activation energy U have been controversial in terms of the temperature and field dependence, and the U values have not been consistent with the macroscopically measured critical current density, J_c We have developed a new approach to obtain the activation energy by considering the nonlinearity between U and J. We find that the activation energy is considerably increased in liquid-quenched Bi-Sr-Ca-Cu-0, as a result of enhanced pinning by finely dispersed precipitates. Our results are consistent with the increased macroscopic parameter J_c.

31248 (BNL–47796) **Frustrated phase separation and high temperature superconductivity.** Emery, V.J. (Brookhaven National Lab., Upton, NY (United States)); Kivelson, S.A. Brookhaven National Lab., Upton, NY (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9205236–1: Conference on phase separation in cuprate superconductors, Sicily (Italy), 6-12 May 1992). Order Number DE92019249. Source: OSTI; NTIS; GPO Dep.

A dilute system of neutral holes in an antiferromagnet separates into a hole-rich and a hole-poor phase. The phase separation is frustrated by long-range Coulomb interactions but, provided the dielectric constant is sufficiently large, there remain large-amplitude low-energy fluctuations in the hole density at intermediate length scales. The extensive experimental evidence showing that this behavior giver, a reasonable picture of high temperature superconductors is surveyed. Further, it is shown that the scattering of mobile holes from the local density fluctuations may account for the anomalous normal-state properties of high temperature superconductors and also provide the mechanism of pairing.

31249 (CEA-CONF–10852) **Electrical and microstructural characterization of silver sheathed high T_c superconductors wires and ribbons.** Chaffron, L. (CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux); Regnier, P.; Schmirgeld, L.; Maurice, F.; Aguillon, C.; Senoussi, S. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux. 1991. 6p. (CONF-911061–: 3. international autumn meeting on modern aspects of superconductivity, Paris (France), 7-10 Oct 1991). Order Number DE92566722. Source: OSTI; NTIS (US Sales Only); INIS.

High Tc superconductors wires and ribbons were prepared according to the powder in tube method. It is shown that the electrical performances of the so prepared superconductors can be considerably improved, first by increasing as much as possible the density of the green body before sintering, and afterwards by melt texturing the sintered conductors. Some measurements of the transport critical current density of our conductors as a function of their diameter or their thickness are then presented and compared with indirect values obtained via the Bean method. The highest transport Jc measured in the present study, before melt texturing, are: 2250 and 5100 A/cm^2 at 77 and 63 K respectively, for a 50 μm thick silver sheathed ribbon. These figures compare nicely with the values of the intergranular critical current densities determined from magnetic measurements which are: 2100 and 5000 A/cm^2 at the same temperatures, and 40000 A/cm^2 at 4.2 K. Much higher intergranular values, in the range of 10^5 A/cm^2 were obtained after melt texturing the wires. Finally, microstructural characterizations carried out by X-ray diffraction, electron microprobe analysis and transmission electron microscopy are reported and discussed.

31250 (CEA-CONF–10884) **Optical properties of Er^{3+} and Tm^{3+} doped Y_2SiO_5.** Wyon, C. (CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees); Aubert, J.J.; Li, C.; Moncorge, R. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 3p. (CONF-9103110–: Advanced solid-state lasers topical meeting, Hilton Head, SC (United States), 18-20 Mar 1991). Order Number DE93701048. Source: OSTI; NTIS (US Sales Only); INIS.

Y_2SiO_5 (YSO) single crystals doped with Er^{3+} and Tm^{3+} ions have been grown and studied. A complete description of the position of the energy levels and of the absorption and fluorescence properties of these potential laser materials is presented.

31251 (CEA-CONF–10892) **YBCO based multilayers for optoelectronic devices.** Villegier, J.C. (CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees); Moriceau, H.; Boucher, H.; Di Cioccio, L.; Ghis, A.; Jaeger, A.; Levis, M.; Pourtier, F.; Schwerdtfeger, M.; Vabre, M.; Villard, C.; Chicault, R. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 13p. (CONF-910580–: ICAM '91: international conference on advanced materials, Strasbourg (France), 27-31 May 1991). Order Number DE92566625. Source: OSTI; NTIS (US Sales Only); INIS.

YBCO based multilayers have been deposited independently by three techniques: laser ablation, inverted cylindrical target sputtering (ICM) and on-axis planar D.C. Magnetron Sputtering. The last technique is used to cover uniformly R-plane sapphire and LaAlO3 2 inch wafers with YBCO or multilayers to achieve optoelectronic devices such as infrared detectors. Very thin (~ 3 nm) YSZ and MgO dielectric films have been studied as tunnel barriers for making such high Tc tunnel junctions. 14 refs., 11 figs.

31252 (CEAC-R–2-91) **Method of characterization of high temperature superconductor ceramics.** Cruz Inclan, C. (Centro de Estudios Aplicados al Desarrollo Nuclear (CEADEN), La Habana (Cuba)); Leyva, A.; Suarez, J.C.; Mora, M.; Aragon, B. Comision de Energia Atomica, La Habana (Cuba). 1991 10p. (In Spanish). Order Number DE93601382. Source: OSTI; NTIS (US Sales Only); INIS.

Different experimental methods to study the galvanomagnetic properties structure and phase composition of HTSC. employed in our laboratory are described this work. These methods may be considered as a referent point for other research, which are interesting in this theme.

31253 (CONF-920402–49) **Microwave sintering of multilayer ceramic capacitors.** Lauf, R.J.; Holcombe, C.E.; Hamby, C. Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Material Research Society spring meeting; San Francisco, CA (United States); 27 Apr - 2 may 1992. Order Number DE92018772. Source: OSTI; NTIS; GPO Dep.

Multilayer ceramic capacitors of several compositions (both Z5U and NPO types) were sintered in air in both conventional and microwave furnaces. Several casketing and insulation techniques were used to improve temperature uniformity and minimize dopant losses. Zirconia and yttria are suitable packing materials as either powders or fibers. After sintering, the packing material remains friable and can be recycled. The presence of metallization layers did not interfere with the microwave process and no arcing was observed at surfaces where the internal electrodes emerged. In some runs, however, local thermal runaway was observed, which could severely decrease process yields and must be eliminated in a commercial process.

31254 (CONF-920448–7) **Cost-effective sintered reaction-bonded silicon nitride (SRBSN) for structural ceramics.** Tiegs, T.N.; Kiggans, J.O. Jr.; Ploetz, K.L. Oak Ridge National Lab., TN (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 94. annual meeting and exposition of the American Ceramic Society; Minneapolis, MN (United States); 12-16 Apr 1992. Order Number DE92019285. Source: OSTI; NTIS; GPO Dep.

Sintered silicon nitride has many superior properties; however, for most applications these materials are too expensive to compete with metal parts. Sintered reaction-bonded silicon nitride (SRBSN) is more economical, with raw materials costs <20% those of comparable high- purity materials, making it competitive with metal parts. Conventional processing of SRBSN requires long nitridation times and a two-step firing process. Microwave (MW) heating reduces the reaction times and is performed in a one-step process, thereby simplifying the operation. The mechanical properties of the MW-SRBSN are not equal to those from the higher-cost powders, but are appropriate for a number of applications at lower temperatures and stress levels. At ambient temperature, typical strength, toughness (K_{Ic} and hardness values are 480 MPa, 4.8 MPa$\sqrt{}$m, and 14 GPa, respectively.

31255 (DOE/ER/45167–T2) **[High temperature fatigue crack growth in ceramics and ceramic composites]: [Annual report, August 1991–July 1992].** Suresh, S. Brown Univ., Providence, RI (United States). 29 Jun 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-84ER45167. Order Number DE92016835. Source: OSTI; NTIS; GPO; GPO Dep.

This three-year program (8/1990–7/1993) is aimed at developing a detailed quantitative understanding of the elevated temperature fracture properties of ceramics and ceramic-matrix composites. In the second year (8/1991–7/1992), considerable progress had been made in our experimental studies and numerical modelling of deformation and fracture in ceramics composites at ambient and elevated temperatures. As part of this effort, new experimental techniques have already been developed for the study of elevated temperature fracture in brittle materials in direct tension loading. The newly set-up facility is now in operation. Furthermore, new experimental results based on quantitative transmission electron microscopy are obtained on high-temperature phase transformations in SiC-whisker-reinforced alumina which have important implications for high-temperature fracture properties. The initially proposed work on the role of glass phase on the high-temperature fracture and fatigue response has been completed. Finite element analyses of cyclic damage zones ahead of tensile and compressive fatigue cracks in ceramic materials have been completed using several different constitutive models for matrix materials.

31256 (DOE/ID/12781–2) **A process control sensor for the glass industry: Phase 1, Extended development program.** Energy and Environmental Research Corp., Irvine, CA (United States). Aug 1992. 58p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC07-89ID12781. Order Number DE92019304. Source: OSTI; NTIS; GPO Dep.

The detailed analysis and testing of the modified sensing system is summarized by the following conclusions: Analyzer long term drift and short term noise improvements have resulted in inherent accuracies of about ± 1/2°C, about equivalent to the black body calibration source. Four different concepts of heating elements were evaluated for use in an in-situ secondary calibration source. The use of a SiN igniter element shows some promise, but requires considerable development. The black body reference is the source of some of the apparent diurnal analyzer drift due to ambient temperature changes. The analyzer has strong ambient temperature sensitivities, specifically the detector and optical bench, which can be substantially mitigated with good internal temperature control (enclosure and detector). Pilot furnace tests using poorly degassed glasses resulted in data which makes conclusions regarding the effects of glass composition and gradient resolution impossible. The impact of bubble inclusions in the glass melt can yield a significant degradation in depth measurement capability as a result of Mei scattering from the bubbles. The degree of degradation depends on bubble size and number density. The above conclusions indicate the program has made significant progress towards correcting previously found deficiencies and has revealed the limitations of the pilot scale test program. Improvements in glass homogeneity, ambient temperature compensation and calibration techniques will offer a high probability of achievement of the accuracy goals in the Phase II program.

31257 (FRNC-TH–3719) **Applied and theoretical study of textural and structural evolution of pure and doped zircon powders.** Methivier, A. Institut National Polytechnique, 38 - Grenoble (France). Feb 1992. 224p. (In French). Order Number DE92566642. Source: OSTI; NTIS (US Sales Only); INIS.

Using different preparation methods, undoped zircon constituted of quadratic and monoclinic phases, and quadratic phase zircon doped with lanthanum, magnesium or silicon were obtained and characterized. An applied kinetic study of the influence of the gaseous phase, and of the doping on pre-sintering shows an accelerating effect of water vapour, an important stabilization effect of lanthanum or silicon additions and a little effect of magnesium additions. This kinetic study leads to a model giving two parallel types of matter transport: one using water vapour catalytic effect, and the other oxygen diffusion.

31258 (LA-UR–92-313) **Ductile phase toughening of molybdenum disilicide by low pressure plasma spraying.** Castro, R.G. (Los Alamos National Lab., NM (United States)); Rollett, A.D.; Stanek, P.W.; Smith, R.W. Los Alamos National Lab., NM (United States). [1992]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921184–1: Workshop on high temperature structural silicides, Gaithersburg, MD (United States), 4-6 Nov 1992). Order Number DE92007409. Source: OSTI; NTIS; GPO Dep.

The low fracture toughness of $MoSi_2$ at ambient temperature has prompted investigations into new processing methods in order to impart some degree of fracture toughness into this inherently brittle material. In the following investigation, low pressure plasma spraying was employed as a fabricating technique to produce spray-formed deposits of $MoSi_2$ and ductile reinforced $MoSi_2$ composites containing approximately 10 and 20 volume percent of a discontinuous tantalum lamelli reinforcement. Fracture toughness (K_{1C}) measurements of $MoSi_2$ and the $MoSi_2$/Ta composites were done using a chevron notched 4-point bend fracture toughness test in both the as-sprayed condition and after hot isostatic pressing at 1200°C/206 MPa for 1 hour. Results from the ductile reinforced $MoSi_2$/Ta composites have shown fracture toughness increases on the order of 200% over the as-sprayed $MoSi_2$. In addition, a marked anisotropy in fracture toughness was observed in the spray-formed deposits due to the layered splat structure produced by the low pressure plasma spray process.

31259 (LA-UR–92-2444) **Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations.** Gotoh, S. (Kawasaki Steel Corp., Chiba (Japan). High Technology Research Labs.); Takamuku, K.; Nakamura, N.; Koshizuka, N.; Willis, J.O. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209175–1: International conference on ferrites, Tokyo (Japan), 29 Sep - 2 oct 1992). Order Number DE92018612. Source: OSTI; NTIS; GPO Dep.

Magnetization and the spatial variation of magnetic flux in a single crystal of $Bi_2Sr_2Ca_1Cu_2O_x$ were studied by using a high contrast magneto-optical observation method (HICOM). Flux penetration, temperature dependence of trapped flux and flux creep have been observed by HICOM. Results show the breakdown of flux pinning and the spatial pinning variation related to sample inhomogeneities.

31260 (ORNL/Sub–87-SA946/02) **Investigation of properties and performance of ceramic composite components.** Stinchcomb, W.W. (Virginia Polytechnic Inst. and State Univ., Blacksburg, VA (United States). Dept. of Engineering Science and Mechanics); Reifsnider, K.L.; Dunyak, T.J. Oak Ridge National Lab., TN (United States); Virginia Polytechnic Inst. and State Univ., Blacksburg, VA (United States). Dept. of Engineering Science and Mechanics. 15 Jun 1992. 162p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (CCMS–92-14). Order Number DE92019911. Source: OSTI; NTIS; GPO Dep.

The objective of the work reported herein is to develop an understanding of the mechanical behavior of advanced ceramic composites subjected to elevated temperature and dynamic (cyclic) loading, to develop a test system and test methods to obtain the properties and performance information required to design engineering components made from ceramic composite materials, and to provide critical and comprehensive evaluations of such materials to material synthesizers and developers to support and enhance progress in ceramic composite material development. The accomplishments of the investigation include the design, development, and demonstration of a high temperature, biaxial mechanical test facility for ceramic composite tubes and the development and validation of a performance simulation model (MRLife) for ceramic composites.

31261 **Combustion synthesis method and products.** Holt, J.B.; Kelly, M. To Dept. of Energy. 1991. USA Patent patent application 7-641,977. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019835. Source: OSTI; NTIS; GPO Dep.

Disclosed is a method of producing dense refractory products, comprising: obtaining a quantity of exoergic material in powder form capable of sustaining a combustion synthesis reaction; removing absorbed water vapor therefrom; cold-pressing said material into a formed body; plasma spraying said formed body with a molten exoergic material to form a coat thereon; and igniting said exoergic coated formed body under an inert gas atmosphere and pressure to produce self-sustained combustion synthesis. Also disclosed are products produced by the method; borides, silicides, sulfides, selenides, aluminides, and composites, especially TiB_2.

31262 **A method of noncontacting ultrasonic process monitoring.** Garcia, G.V.; Walter, J.B.; Telschow, K.L. To Dept. of

Energy. 1991. USA Patent patient application 7-642,578. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019830. Source: OSTI; NTIS; GPO Dep.

A method of monitoring a material during processing comprising the steps of (a) shining a detection light on the surface of a material; (b) generating ultrasonic waves at the surface of the material to cause a change in frequency of the detection light; (c) detecting a change in the frequency of the detection light at the surface of the material; (d) detecting said ultrasonic waves at the surface point of detection of the material; (e) measuring a change in the time elapsed from generating the ultrasonic waves at the surface of the material and return to the surface point of detection of the material, to determine the transit time; and (f) comparing the transit time to predetermined values to determine properties such as, density and the elastic quality of the material.

31263 (UCRL-CR--111008) **Alternate electrode materials for the SP100 reactor: Final report.** Randich, E. Lawrence Livermore National Lab., CA (United States). May 1992. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019570. Source: OSTI; NTIS; INIS; GPO Dep.

This work was performed in response to a request by the Astro-Space Division of the General Electric Co. to develop alternate electrodes materials for the electrodes of the PD2 modules to be used in the SP100 thermoelectric power conversion system. Initially, the project consisted of four tasks: (1) development of a ZrB_2 (C) CVD coating on SiMo substrates, (2) development of a ZrB_2 (C) CVD coating on SiGe substrates, (3) development of CVI W for porous graphite electrodes, and (4) technology transfer of pertinent developed processes. The project evolved initially into developing only ZrB_2 coatings on SiGe and graphite substrates, and later into developing ZrB_2 coatings only on graphite substrates. Several sizes of graphite and pyrolytic carbon-coated graphite substrates were coated with ZrB_2 during the project. For budgetary reasons, the project was terminated after half the allotted time had passed. Apart from the production of coated specimens for evaluation, the major accomplishment of the project was the development of the CVD processing to produce the desired coatings.

31264 (UCRL-JC--110481) **Flux pinning in oxygen-depleted $YBa_2Cu_3O_{7-y}$ single crystals.** Lan, M.D. (California Univ., Davis, CA (United States). Dept. of Physics); Liu, J.Z.; Shelton, R.N.; Radousky, H.B.; Veal, B.W. Downey, J.E. Lawrence Livermore National Lab., CA (United States). Apr 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920402--51: Material Research Society spring meeting, San Francisco, CA (United States), 27 Apr - 2 may 1992). Order Number DE92019548. Source: OSTI; NTIS; GPO Dep.

Magnetic properties and flux pinning of oxygen-deficient $YBa_2Cu_30_{7-y}$ single crystals have been studied. The superconducting transition temperature and inductive critical current density decrease as the level of oxygen depletion increases. No obvious enhancement in the pinning strength was found in the oxygen-depleted $YBa_2Cu_3O_{7-y}$ system for the applied field along the c-axis. We attribute this absence of enhanced pinning to the mismatch of the oxygen vacancy size with the superconducting coherence length over our temperature regime.

3606 Other Materials

Refer also to citation(s) 30691, 30692, 30697, 30721, 30821, 30822, 30823, 31143, 31222, 31242, 31260, 31313, 31360, 31603, 31610, 31613, 31622, 31751, 32361, 32367, 32477

31265 (ANL/CP--76560) **Thermal effects on the frequency response of piezoelectric crystals.** Canfield, T.R. (Argonne National Lab., IL (United States)); Jones, M.T.; Plassmann, P.E.; Tang, M.S.H. Argonne National Lab., IL (United States). 10 Jun 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-921110--17: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019039. Source: OSTI; NTIS; GPO Dep.

In this paper we describe a solution strategy to determine the natural frequencies of piezoelectric crystals subject to moderate changes in temperature and a variety of boundary constraints. The finite element equations governing piezoelectricity are derived based upon a Galerkin formulation of the problem. Suitable assumptions are made to linearize the steady-state (static) problem leading to an iteration scheme that can be used to refine the solution and include non-linear geometric effects caused by deformation. The eigenvalue problem is cast in this perturbed state to allow more accurate prediction of resonant frequencies.

31266 (CNIC--00387) **Investigation of the neutron diffraction anomaly and electrical behaviour of α-$LiIO_3$ single crystal under AC field.** Wang Guang (Shengli Petroleum Administrative Bureau Research Inst. for Drilling Tech., SD (China)); Yang Zhen. China Nuclear Information Centre, Beijing, BJ (China). 1990. 10p. (In Chinese). (IAE--0074.). Order Number DE93601399. Source: OSTI; NTIS (US Sales Only); INIS.

A systematic study of the unique neutron diffraction and electric behaviour of α-$LiIO_3$ single crystal under AC field is reported. A frequency dependent rectification effect was observed and can be explained as the relaxation process in the ionic conduction. Theoretical treatment using Boltzmann equation gives satisfactory agreement with experimental results. The neutron diffraction anomaly can be attributed to the effect of the rectified DC current in the sample.

31267 (CNIC--00504) **Expensive-graphite-sandwiched spiral-wound stainless steel gasket applied to manhole sealing joints of nuclear equipment.** Diao Wentang (Research Inst. of Nuclear Power Operation, Wuhan, HB (China)); Quan Huiqin. China Nuclear Information Centre, Beijing, BJ (China). Jun 1991. 13p. (In Chinese). (RINPO--0008.). Order Number DE93601397. Source: OSTI; NTIS (US Sales Only); INIS.

The test results of domestic expansive-graphite-sandwiched spiral-wound stainless steel gaskets which were mounted on a manhole of steel vessel model with 1 : 1 scale are summarized. After testing mechanical properties in the cold state, the tests were carried out on a large hot-state experimental rig. Conditions were selected in accordance with actual operating conditions of nuclear primary equipment or more severe. The tightness of sealing, stud tension, and variations of angular displacement and gap between manhole cover and base were examined under conditions equivalent to the duration of reactor start-up (temperature and pressure up), normal operation and shut-down (temperature down). The simulation of changes of tightness, adjacent stud tensions and total tension that caused by one stud broken has been completed. The effect of impurity of sulphur contained in gaskets on water quality in the circuit was studied. The reliability of domestic gaskets applied to manhole sealing joints in nuclear equipment is also discussed.

31268 (CONF-920694--2) **Atomistic processes of surface segregation during Si-Ge MBE growth.** Jesson, D.E. (Oak Ridge National Lab., TN (United States)); Pennycook, S.J.; Baribeau, J.M.; Houghton, D.C. Oak Ridge National Lab., TN (United States). [1992]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Spring meeting of the European Materials Research Society: international conference on electronic materials; Strasbourg (France); 2-5 Jun 1992. Order Number DE92019180. Source: OSTI; NTIS; GPO Dep.

Atomic-scale segregation at step edges during growth is proposed as the origin of ordering in the Si-Ge system. Cross-sectional Z-contrast imaging of as-grown structures reveals that a variety of ordered phase variants can exist at Si on Ge interfaces as a result of vertical segregation during superlattice growth. Long-range ordering in alloys is predicted to arise due to segregation at monolayer or bilayer steps depending on the evolving surface morphology.

31269 (CONF-9209162--1) **Thermal analysis of alkylammonium salts.** Xenopoulos, A. (Oak Ridge National Lab., TN (United States)); Wunderlich, B. Oak Ridge National Lab., TN (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract AC05-84OR21400. Grant DMR 92-00520. From 21. North American Thermal Analysis Society meeting; Atlanta, GA (United States); 13-16 Sep 1992. Order Number DE92018866. Source: OSTI; NTIS; GPO Dep.

Symmetric tetra-n-alkylmmonium halides are analyzed in detail by thermal analysis. In an effort to understand motion and disorder, three aspects of the thermal properties are addressed. First, the entropies of the first-order transitions are compared to empirical rules about positional, orientational, and conformational disordering, allowing a first, preliminary assignment of the mesophases. Second, the heat capacities in the solid state are measured from 130 K through the respective transitions and compared to the vibrational contribution to the heat capacity. Positive deviations of measurements from calculations occur for some of the salts already below room temperature, implying the existence of nonvibrational motion in the solid state. Third, the nonequilibrium behavior is analyzed. Gradual changes on heating, and incomplete ordering on cooling, including the observation of a glass transition, are noted.

31270 (DOE/ER/45401–3) **Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991.** Aziz, M.J. Harvard Univ., Cambridge, MA (United States). Div. of Applied Sciences. 14 Jul 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-89ER45401. Order Number DE92019744. Source: OSTI; NTIS; GPO Dep.

We have measured solute trapping of several solutes in Al and Ni during rapid solidification. We have also made preliminary measurements of solute trapping of As in Si, trapped 20 atomic percent As in Si, and made a preliminary measurement of the T_0 curve in Si-As. 5 figs.

31271 (ECN-RX–91-069) **Jain-Lidiard model calculations of radiation damage in sodium chloride: Presented at the Conference REI'6 (Radiation Effects in Insulators-6), June 24-28, 1991, Weimar, Germany.** Soppe, W.J. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H). Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jul 1991. 13p. Contract no. FI 1W/0235. (CONF-910646–: 6. conference on radiation effects in insulators, Weimar (Germany), 24-28 Jun 1991). Order Number DE93601403. Source: OSTI; NTIS; INIS.

This work has been performed in the framework of the European Atomic Energy Community R and D Program on Management and Storage of Radioactive Waste; to be published in a special issue of: Nuclear Instruments and Methods in Physics Research.

In this paper numerical results on radiation damage of NaCl, obtained with an improved version of the Jain-Lidiard model are presented. The major radiation damage products are colloidal Na particles and Cl_2 molecules, both embedded in the NaCl lattice. The geometry of the metallic Na particles is likely to be fractal. It is shown that the assumption of fractal dimensionality leads to theoretical damage concentrations which are appreciably smaller than predicted by the original Jain-Lidiard model in which a non-fractal (Euclidian) dimension of the colloidal particle is assumed. (author). 13 refs.; 3 figs.; 1 tab.

31272 (IS-M–714) **Ductile fracture process of discontinuous fiber reinforced composites.** Biner, S.B. Ames Lab., IA (United States). [1992]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-82. (CONF-921172–1: Composites II, Anaheim, CA (United States), 8 Nov 1992). Order Number DE92016298. Source: OSTI; NTIS; GPO Dep.

In this study the role of fiber morphology, interface failure and void nucleation mechanisms within the matrix on the deformation and fracture behavior of discontinuous fiber reinforced composites was numerically investigated. The matrix was modeled using a constitutive relationship that accounts for strength degradation resulting from the nucleation and growth of voids, and fibers are assumed to be elastic. The debonding behavior at the fiber interfaces was simulated in terms of a cohesive zone model which describes the decohesion by both normal and tangential separation. The results indicate that in the absence of interface failure, for a given matrix failure mechanism the fiber morphology strongly affects the strength and ductility of discontinuous fiber reinforced composites. The weak interfacial behavior can significantly increase the ductility without sacrificing the strength for certain fiber morphology and for certain void nucleation mechanisms.

31273 (LA-UR–92-2557) **Dislocation and pores in mullite from diphasic gels.** Wei, Wen-Cheng J. (National Taiwan Univ., Taipei (Taiwan, Province of China). Inst. of Materials Science and Engineering); Mitchell, T.E.; Halloran, J.W. Los Alamos National Lab., NM (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-920891–3: 5. Asia-Pacific electron microscopy conference, Beijing (China), 1-6 Aug 1992). Order Number DE92040384. Source: OSTI; NTIS; INIS; GPO Dep.

Stoichiometric mullite prepared from the reactions of nanometer-sized pseudo-bochmite and acidic-catalysed silica gel has non-sinterable pores and dislocations. The formation of the pores is accompanied by densification and reactions of the diphasic alumino-silicate gel matrix. These pores tend to be faceted and show low-index crystallographic planes, (110) and (211). After heat treatment at $\geq$ 1400°C for 24 hr. Dislocations are identified by weak- beam, dark-field, and 2-beam techniques, that show basically three types: one with Bergers vector 001 and is pure screw or a mix: the others may have 210 or 131 Bergers vector. The possible atomic models near last two dislocations are proposed. But the direct observation needs more TEM work.

31274 (MLM–3751) **Spectroscopic studies of the 110°C thermal aging of PETN.** Dosser, L.R. (Mound, Miamisburg, OH (United States)); Seliskar, C.J. Mound, Miamisburg, OH (United States). 30 Jul 1992. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-88DP43495. Order Number DE92040816. Source: OSTI; NTIS; GPO Dep.

The 110°C thermal aging parameters, including initial rates of decomposition, of four types of pentaerythritol tetranitrate (PETN) over a period of ten months are presented. Both decomposition products nitric oxide, NO, and nitrogen dioxide, $N0_2$ were monitored from multiple, hermetically-sealed, in vacuo samples. Nitric oxide appears to be the first nitrogen oxide product evolved. Nitrogen dioxide produced by abrupt thermal aging is more slowly converted to nitric oxide by a 1:1 process. The behavior of samples of RR5K PETN was significantly different from that of other powders studied. Further work is in progress to better define the thermal aging of RR5K PETN.

31275 (NUTEK-FJV–92-1) **Measuring equipment to determine the status of polyethylene pipes.** Borgstroem, M. (Chalmers Univ. of Technology, Goeteborg (SE). Dept. of Building Technology). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1992. 74p. (In Swedish). Project NUTEK-656-063. Order Number DE92563020. Source: OSTI; NTIS.

The aim of this project was to develop measuring equipment to determine the status of existing underground bonded district heating mains with steel service pipes, polyethylene casing and polyurethane insulation. In order to establish the condition of the heating mains and thus be able to determine whether heat losses have increased, it is possible to begin by establishing the thermal conductivity of the mains insulation. In that case, it is necessary to know the temperature inside and outside the insulation, the extent of heat flow measured on the surface of the mains, and the dimensions of the mains. The method used in this project is based on a simple means of measuring these parameters and then calculating the thermal conductivity of the mains insulation. The surrounding earth need not be taken into consideration, as the mains will be exposed when measurements are conducted in the field. The heat flow measured in the mains with diameters of 90-280 mm were compared to estimated heat flows from mains with the same dimensions and the same temperature on inner and outer surface of the heating mains. The two heat flow meters used were calibrated before the measurements began against a flat surface. In measurements, the heat flow meter must be protected from external disturbances by, for example, using an extra layer of insulation. The thickness and width of this protective insulation should be adapted to the insulation thickness of the mains and to the variations in temperature of the district heating water. 29 refs.

31276 **Fabrication of high temperature materials by exothermic synthesis and subsequent dynamic consolidation.** Rabin, B.H.; Korth, G.E.; Wright, R.N.; Williamson, R.L. To Dept. of Energy. 1991. USA Patent patent application 7-641,945. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019836. Source: OSTI; NTIS; GPO Dep.

An apparatus and method for synthesizing a composite material such as titanium carbide and alumina from exothermic reaction of a sample followed by explosive induced consolidation of the reacted sample. The apparatus includes a lower base for holding a powdered composite sample, an igniter and igniter powder for igniting the sample to initiate an exothermic reaction and a piston for dynamically compressing the sample utilizing an explosive reaction.

31277 (PNL-SA-21006) **Global-local finite element analysis of composite structures.** Deibler, J.E. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 6p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206253-1: Swanson Analysis Systems Technology conference, Pittsburg, PA (United States), 8-11 Jun 1992). Order Number DE92019138. Source: OSTI; NTIS; GPO Dep.

The development of layered finite elements has facilitated analysis of laminated composite structures. However, the analysis of a structure containing both isotropic and composite materials remains a difficult problem. A methodology has been developed to conduct a "global-local" finite element analysis. A "global" analysis of the entire structure is conducted at the appropriate loads with the composite portions replaced with an orthotropic material of equivalent materials properties. A "local" layered composite analysis is then conducted on the region of interest. The displacement results from the "global" analysis are used as loads to the "local" analysis. the laminate stresses and strains can then be examined and failure criteria evaluated.

31278 (SAND-92-1267C) **Uses of Monte Carlo computer simulations in understanding epitaxial growth and ion bombardment of Si(001).** Chason, E. Sandia National Labs., Albuquerque, NM (United States). [1992]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9206250-1: Department of Energy (DOE) workshop in surface diffusion in the growth of materials, Santa Fe, NM (United States), 1-3 Jun 1992). Order Number DE92016944. Source: OSTI; NTIS; GPO Dep.

Understanding the mechanisms of growth during vapor-phase deposition is critical for the precise control of surface morphology required by advanced electronic device structures. Yet only relatively recently have the tools for observing this growth on an atomic-level scale become available (via scanning tunneling microscopy (STM), reflection high energy electron diffraction (RHEED) and low-energy electron microscopy (LEEM)). We present results from our own RHEED and STM measurements in which we use computer simulations to aid in determining the fundamental surface processes which contribute to.the observed structures. In this study of low-energy ion bombardment and growth on Si(001), it is demonstrated how simulations enable us to determine the dominant atomistic process.

31279 (SAND-92-1342C) **Bonding in simple phosphate glass.** Brow, R.K. Sandia National Labs., Albuquerque, NM (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921073-1: International Congress on Glass, Madrid (Spain), 4-9 Oct 1992). Order Number DE92019437. Source: OSTI; NTIS; INIS; GPO Dep.

The bonding configurations for simple phosphate glasses are quantitatively described by both the relative concentrations of different polyhedral phosphate sites (i.e., the Q^n description) determined by ^{31}p magic angle spinning nuclear magnetic resonance (MAS NMR) spectroscopy and by the relative concentrations of bridging and nonbridging oxygen as measured by x-ray photoelectron spectroscopy (XPS). Both spectroscopies illustrate the depolymerizing effects of modifier additions in two series of Na_2O and ZnO-P_20_5 glasses.

31280 (UCRL-JC-108831) **Determination of the permeability of carbon aerogels by gas flow measurements.** Kong, F.M.; Hulsey, S.S.; Alviso, C.T.; Pekala, R.W. Lawrence Livermore National Lab., CA (United States). Apr 1992. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920402-54: Material Research Society spring meeting, San Francisco, CA (United States), 27 Apr - 2 may 1992). Order Number DE92019574. Source: OSTI; NTIS; GPO Dep.

Carbon aerogels are synthesized via the polycondensation of resorcinol and formaldehyde, followed by supercritical drying and pyrolysis at 1050°C in nitrogen. Because of their interconnected porosity, ultrafine cell structure and high surface area, carbon aerogels have many potential applications, such as in supercapacitors, battery electrodes, catalyst supports, and gas filters. The performance of carbon aerogels in the latter two applications depends on the permeability or gas flow conductance in these materials. By measuring the pressure differential across a thin specimen and the nitrogen gas flow rate in the viscous regime, we calculated the permeability of carbon aerogels from equations based upon Darcy's law. Our measurements show that carbon aerogels have apparent permeabilities on the order of $10^{-12}$to 10^{-10} cm^2 for densities ranging from 0.44 to 0.05 g/cm^3. Like their mechanical properties, the permeability of carbon aerogels follows a power law relationship with density and average pore size. Such findings help us to estimate the average pore sizes of carbon aerogels once their densities are known. This paper reveals the relationships among permeability, pore size and density in carbon aerogels.

31281 (UCRL-JC-109631) **Mechanics of inhomogeneous rock: The two-constituent porous medium paradigm.** Berryman, J.G. Lawrence Livermore National Lab., CA (United States). Feb 1992. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-921110-1: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92008069. Source: OSTI; NTIS; GPO Dep.

The standard paradigm for analysis of rock deformation arises from postulating the existence of "an equivalent homogeneous porous rock." Counterexamples show that this paradigm is inconsistent with some quite common measurements on rocks. Observed variations of the unjacketed bulk modulus with pressure show that a single component model for rock is generally inadequate. Furthermore, data on the pore pressure dependence of fluid permeability for some rocks cannot be explained using any equivalent homogeneous porous medium. In contrast, a positive result shows that deformation measurements on both high porosity sandstones and low porosity granites can be explained adequately in terms of an equivalent two-constituent model of porous rocks, for which exact results have recently been discovered.

31282 (UCRL-JC-109956) **Aerogels, emulsions, and composites: Controlling structure with organic sol-gel chemistry.** Pekala, R.W.; Alviso, C.T.; Hulsey, S.S.; Kong, F.M. Lawrence Livermore National Lab., CA (United States). Apr 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-921110-25: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019575. Source: OSTI; NTIS; GPO Dep.

The sol-gel polymerization of resorcinol with formaldehyde is a proven synthetic route for the formation of organic aerogels. These materials can also be pyrolyzed in an inert atmosphere to form vitreous carbon aerogels. Both resorcinol-formaldehyde and carbon aerogels are characterized by high porosity (50–98%), ultrafine cell/pore sizes (< 100 mn), high surface area (400–1000 m^2/g), and a solid matrix composed of interconnected colloidal-like particles or fibrous chains with characteristic diameters of 10 nm. While this nanostructure and the low Z (atomic number) composition are responsible for the unique optical, thermal, acoustic, mechanical, and electrical properties of organic aerogels, there are certain applications in which a larger scale structure is also desired in combination with the unique features of the aerogel. In order to achieve this goal, we have been emulsifying our resorcinol-formaldehyde sols to form foams which retain the aerogel framework but have some cells/pores as large as 2 μm. In another approach, we have infused an emulsion-derived polystryene foam with a resorcinol-formaldehyde sol to form a new composite foam. This paper addresses the chemistry-structure-property relationships of organic aerogels, their emulsion-derived derivatives, and composite foams.

31283 (UCRL-JC–110324) **C_{60} transformations at high pressures.** Yoo, C.S.; Nellis, W.J.; Sattler, M.L.; Musket, R.G.; Hinsey, N.; Brocious, W. Lawrence Livermore National Lab., CA (United States). Apr 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920402–52: Material Research Society spring meeting, San Francisco, CA (United States), 27 Apr - 2 may 1992). Order Number DE92019546. Source: OSTI; NTIS; GPO Dep.

C_{60} molecules have been studied at bodi shock and static high pressures. Under shock compressions C_{60} fullerenes are stable into the 13–17 GPa prrssure range. The onset of a fast (~0.5 ps) reconstructive Information to graphite occurs near 17 GPa. The graphite recovered from 27 GPa and about 900 K is relatively well with L_a. Above 50 GPa a continuous transformation to an amorphous state is observed in recovered specimens. A transparent, metastable carbon phase was recovered from thin films of C_{60}, shocked to 69 GPa and 2200 K and then rapidly quenched to 1000 K. The selected area diffraction patterns indicate that the metastable carbon contains an amorphous diamond and n-diamond. Under hydrostatic compressions C_{60} molecules transform reversibly to a semi-transform phase in the pressure range of 15–25 GPa with a large pressure hysteresis. The high pressure phase consists of interconnected strongly interacting C_{60} agglomerates, or networks of fullerenes, whose stability continuously increases with increase of pressure. Above 27 GPa the transition becomes irreversible, and the material recovered from high pressure is metastable and diamond-like at ambient conditions. These pressure-induced transitions are explained in terms of π-electron rehybridization between C_{60} molecules, which occurs at substantially decreased intermolecular distances.

31284 (Y/EN–4325) **Structural testing of clay tile walls testing and evaluation program.** Bennett, R.M. (Tennessee Univ., Knoxville, TN (United States). Dept. of Civil Engineering); Flanagan, R.D. Oak Ridge Y-12 Plant, TN (United States). 16 Mar 1992. 203p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. (CNPE/HCT–2). Order Number DE92019489. Source: OSTI; NTIS; GPO Dep.

Martin Marietta Energy Systems, inc. is conducting a comprehensive program to assess the safety of critical Department of Energy facilities to natural phenomena hazards. Many of these facilities at the Oak Ridge Y-12 Plant were constructed in the mid to late 1940s and are comprised of unreinforced hollow clay tile infilled steel frames.The assessment of these facilities includes the development of a rational method of evaluating hollow clay tile infilled frame structures subjected to seismic forces. This document provides guidance for the various testing and analysis activities to be performed in the development of the evaluation methodology. This document contains a review of literature pertaining to masonry infilled steel frames, preliminary analysis of infilled frame structures, a discussion of applicable destructive andnondestructive testing procedures for hollow clay tile, and a description of numerical analysis tasks for hollow clay tile structures. The physical testing procedures are broadly divided into three categories: existing conditions, material properties and system behavior. The state of knowledge of hollow clay tile infilled frame behavior as ft exists near the beginning of the testing and evaluation program is presented. As the evaluation program continues and more is learned about the behavior of hollow clay tile infills, portions of this document may be outdated and/or superseded. The concepts of this document will evolve as the testing and evaluation program unfolds.

40 CHEMISTRY

31285 (UCRL–53689-91) **Laboratory directed research and development FY91: Revision 1.** Anderson, S.E.; Hedman, I.; Kirvel, R.D.; McGregor, C.K. (eds.). Lawrence Livermore National Lab., CA (United States). [1991]. 196p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019751. Source: OSTI; NTIS; INIS; GPO Dep.

This review of research programs at Lawrence Livermore National Laboratory is composed of individual papers on various subjects. Broad topics of interest are: chemistry and materials science, computation, earth sciences, engineering, nuclear physics, and physics, and biology. Director's initiatives include the development of a transgenic mouse, accelerator mass spectrometry, high-energy physics detectors, massive parallel computing, astronomical telescopes, the Kuwaiti oil fires and a compact torus accelerator. (GHH)

4001 Analytical and Separations Chemistry

Refer also to citation(s) 30470, 30643, 30699, 30714, 30716, 30763, 31045, 31079, 31310, 31320, 31724, 31763, 31765, 32365

31286 (ANL/ACL–92/1) **Innovative methods for inorganic sample preparation.** Essling, A.M.; Huff, E.A.; Graczyk, D.G. Argonne National Lab., IL (United States). Analytical Chemistry Lab. Apr 1992. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92019335. Source: OSTI; NTIS; INIS; GPO Dep.

Procedures and guidelines are given for the dissolution of a variety of selected materials using fusion, microwave, and Parr bomb techniques. These materials include germanium glass, corium-concrete mixtures, and zeolites. Emphasis is placed on sample-preparation approaches that produce a single master solution suitable for complete multielement characterization of the sample. In addition, data are presented on the soil microwave digestion method approved by the Environmental Protection Agency (EPA). Advantages and disadvantages of each sample-preparation technique are summarized.

31287 (ANL/ACL–92/2) **Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples.** Smith, L.L.; Markun, F.; TenKate, T. Argonne National Lab., IL (United States). Analytical Chemistry Lab. Jun 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019413. Source: OSTI; NTIS; INIS; GPO Dep.

The Analytical Chemistry Laboratory at Argonne National Laboratory performs radiochemical analyses for a wide variety of sites within the Department of Energy complex. Since the chemical history of the samples may vary drastically from site to site, the effectiveness of any analytical technique may also vary. This study compares a potassium fluoride-pyrosulfate fusion technique with an acid leachate method. Both normal and high-fired soils and vegetation samples were analyzed for both americium and plutonium. Results show both methods work well, except for plutonium in high-fired soils. Here the fusion method provides higher accuracy.

31288 (ANL/CP–76818) **Background modelling in Rietveld analysis.** Richardson, J.W. Jr. Argonne National Lab., IL (United States). [1989]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-8906324–2: International workshop on the Rietveld method, Petten (Netherlands), 13-15 Jun 1989). Order Number DE92018791. Source: OSTI; NTIS; GPO Dep.

The Rietveld method is a complete profile fitting technique, which requires modelling the total scattering from crystalline samples. Many diffraction experiments involve the analysis of scattering patterns containing additional noncrystalline scattering components; these components are broad oscillations superimposed on the sharp Bragg pattern. Conventional background functions cannot be used for the noncrystalline scattering; but treating the additional scattering as though it were from an amorphous material can provide additional structural information. This is demonstrated using $AlPO_4$-5, an aluminophosphate framework molecular sieve. The correlation function for the amorphous component has peaks close to interatomic distances also characteristic of the crystal. The cose agreement suggests that the amorphous component, although lacking long-range periodicity, has a similar atomic arrangement to the crystal. A calibration experiment is performed using a 50-50 wt% quartz-amorphous silica mixture; the crystal structural parameters obtained from Fourier-filtered data are compared with neutron powder diffraction refinement of quartz and single-crystal x-ray results. All refined parameters agree within 3-4 σ. 2 tables, 5 refs, 6 figs. (DLC)

31289 (CEA-CONF–10840) **Oxygen concentration measurements using the ESR line modification of PcLi molecules.** Duret, D.; Moussavi, M.; Jeandey, C.; Beranger, M. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 2p. (CONF-9109421–: 5. European Conference on Sensors V, Rome (Italy), 30 Sep - 2 oct 1991). Order Number DE92566701. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELECTRON SPIN RESONANCE/ quantitative chemical analysis; ELECTRON SPIN RESONANCE/ oxygen; OXYGEN/electron spin resonance; OXYGEN/quantitative chemical analysis; OXYGEN; QUANTITY RATIO; LITHIUM COMPOUNDS; PHTHALOCYANINES; CRYSTAL STRUCTURE

31290 (CEA-R–5578) **Extraction of molybdenum by the di-n-butyl 2.2.N.hydroxyhexanamide (tri-n-butylacetohydroxamic acid) from aqueous acidic media.** Landesman, C. CEA Centre d'Etudes de la Vallee du Rhone, 30 - Marcoule (France). Dept. des Procedes de Retraitement; Paris-11 Univ., 91 - Orsay (France). Nov 1991. 192p. (In French). Order Number DE92566738. Source: OSTI; NTIS (US Sales Only); INIS.

The design of a new industrial process for the production of the fission product ^{99} Mo, led to study of the extraction of ^{99}Mo(VI) by the tri-n-butylacetohydroxamic acid (TBAH). Due to the large affinity of TBAH for Mo(VI), the study was conducted with unusual experimental conditions : the concentrations of the extracting molecule and metallic ion were very low, typically $C_{TBAH} = 10^{-5}$ M and $_{CMo(VI)} = 10^{-8}$ M. The overall extraction system was described using a mathematical model quite simple, which, in particular, takes into account all the Mo(VI) species present in the aqueous phase. When the extractions were carried out from a perchloric acid medium, two different extraction mechanisms of Mo(VI) were identified : for $^{C}HC10_4 < 1$ mol/dm^3, the extraction of Mo(VI) corresponds to a cationic exchange, whereas for $^{C}HC10_4 > 3$ mol/dm^3, a neutral Mo(VI) compound is extracted. Moreover it was found that the extracting system Mo(VI)/TBAH is extremely sensitive to the temperature. It is thus possible to change the way of the transfer of Mo(VI) between the two phases, by control of the temperature of the mixture : the extraction is carried out at room temperature and the back-extraction at elevated temperature.

31291 (CEA-R–5582) **Intercomparison of plutonium isotopic composition measurements by X-and gamma-ray spectrometry; results from the Pidie exercise, final report.** Morel, J.; Chauvenet, B. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. des Applications et de la Metrologie des Rayonnements Ionisants. Dec 1991. 98p. (In English, French). Order Number DE92566739. Source: OSTI; NTIS (US Sales Only); INIS.

The present report summarizes the results from the intercomparison called PIDIE exercise which has been initiated by the ESARDA Working Group on Techniques and Standards for Non-Destructive Analysis. The aim of this exercise carried out in 1988 was to test the X-and gamma-ray spectrometry methods used to determine the plutonium isotopic composition in a large range of isotopic ratios. Sets of seven samples with different isotopic composition were measured by nine participating laboratories. The final results with uncertainty indicators are presented ; they are compared with results from complementary destructive analyses. An analysis of the parameters and the error sources influencing the results is proposed. No important bias has been observed from this exercise. Appreciable progress have been recorded from both more elaborate spectrum analysis methods and better equipment.

31292 (CNIC–00443) **Determination of plutonium in environmental water.** Yan Qimin (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Liu Shousun. China Nuclear Information Centre, Beijing, BJ (China). Nov 1990. 8p. (In Chinese). (IAE–0083.). Order Number DE93601184. Source: OSTI; NTIS (US Sales Only); INIS.

The determination of Pu in environmental water is described. The Pu in water was concentrated with hydroxides coprecipitation of calcium and magnesium. Then the Pu was separated and purified by the extraction-chromatography column of TOA-silicane white carrier. The column was washed with 10 mol/L HCl and 3 mol/L HNO_3, and the Pu was desorpted with the mixed solution of 2.5 mmol/L $H_2C_2O_4$ and 0.15 mol/L HNO_3. Finally the Pu was electrodeposited in a stainless steel plate. The electrodeposited plate was measured by a low-background alpha counter or alpha spectrometer. The decontamination factors of important nuclides by using this method were over 10^4. The rate of recovery for Pu in 50 L water was over 69%. The lowest detection limit was 6.5×10^{-6} Bq/L.

31293 (CRN-CPR–91-07) **Perfecting of a computer program for PIXE quantitative analysis.** Aspiazu, J. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires; Strasbourg-1 Univ., 67 (France). Dec 1991. 97p. (In French). Order Number DE93701129. Source: OSTI; NTIS (US Sales Only); INIS.

PIXE technique is used to measure element abundance in geological, archaeological samples, in medicine ...In this thesis, the author recalls the theoretical bases of this analysis method, gives the calculation method of element ratios that he has used for thick samples, describes the computer programs (XMONO and PIXCO) and then verifies experimentally his results that he has obtained with the PIXCO program results. The comparative studies show that PIXCO program gives good results for the elements of $20<Z<40$ but ignores X secondary emission. PIXCO program is interesting for the analysis of next samples in series.

31294 (CRN-CPR–91-09) **Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site.** Rossini, I. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires; Strasbourg-1 Univ., 67 (France). Jun 1991. 141p. (In French). Order Number DE93701128. Source: OSTI; NTIS (US Sales Only); INIS.

The first part of this thesis is about possible analysis methods (XRF, PIXE, INAA, laser fluorimetry, and ICP), applied to Uranium, Thorium and Rubidium assays in archaeological clays and potteries. The best results have been obtained with Neutron Activation technics. The second part is about the multi-element analysis of quarries and about the research by statistical treatment of correlations between the element concentrations and the sampling sites (excavations, quarries).

31295 (DOE/ER/13181–T3) **The hydrophobic character of nonsulfide mineral surfaces as influenced by double-bond reactions of adsorbed unsaturated collector species: Progress report.** Miller, J.D. Utah Univ., Salt Lake City, UT (United States). Dept. of Mechanical Engineering. Jun 1992. 53p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-84ER13181. Order Number DE92019012. Source: OSTI; NTIS; GPO; GPO Dep.

The primary goal of this research is to improve the flotation efficiency of nonsulfide mineral systems by establishing the fundamental features of collector adsorption reactions and developing appropriate chemical control strategies. In situ real-time FR-IR/IRS measurements, nonequilibrium electrophoresis, vacuum flotation, contact-angle goniometry, and laser Raman spectroscopy have been used to accomplish this goal. These experimental techniques have led to the determination of important information concerning collector adsorption phenomena in each nonsulfide mineral system. For example, the demonstration of polymerization of adsorbed unsaturated surfactant species has added a new dimension to semi-soluble salt flotation chemistry and may have more general utility. Furthermore, refinement of the in situ FT-IR/IRS analysis has been accomplished particularly for the examination of surfactant aggregation phenomena at nonsulfide mineral surfaces. Finally, the significance of the lattice ion hydration theory has been demonstrated by nonequilibrium electrophoretic mobility measurements, and the new results will provide a better basis for the understanding of soluble-salt flotation phenomena.

31296 (DOE/MC/26364–3101) **The MAGSORB process for bulk separation of carbon dioxide: Final report.** Knight, R.A. (Institute of Gas Technology, Chicago, IL (United States)); Carty, R.H.; Duthie, R.G.; Pechtl, P.A. Institute of Gas Technology, Chicago, IL (United States). Apr 1992. 93p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-90MC26364. Order Number DE92001296. Source: OSTI; NTIS; GPO Dep.

The experimental work performed in this program has revealed the impact of formulation procedure on MAGSORB properties, and has shown that the sorbent has adequate potential as a CO_2 sorbent for synthesis gas production. MAGSORB is a highly selective CO_2 sorbent that does not react with other synthesis gas components (H_2, CO, H_2O, H_2S, or NH_3), nor is its performance adversely affected by these components. A technoeconomic analysis has shown that the integration of MAGSORB into a syngas conditioning train can result in significant capital and operating cost benefits when compared with conventional technology. Several areas of further development are still needed. The laboratory preparation method used in this program may not be optimal in terms of sorbent properties and practicality on a commercial scale. Alternative methods involving co-precipitation or co-crystallization of $MgCO_3$ and K_2CO_3 should be investigated. The life-cycle tests have shown that the sorbent as make in this study loses reactivity after absorption/desorption cycling. A fundamental study of surface properties should be made to determine the cause of deactivation. Specific recommendations for future MAGSORB development activities are given.

31297 (DOE/PC/79924–T3) **Operating characteristics of rotating beds: Technical progress report for the third quarter 1988.** Keyvani, M.; Gardner, N.C. Case Western Reserve Univ., Cleveland, OH (United States). Dept. of Chemical Engineering. [1988]. 56p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-87PC79924. Order Number DE92019661. Source: OSTI; NTIS; GPO Dep.

Vapor-liquid contacting in high gravitational fields offers prospects for significant reductions in the physical size, capital, and operating costs of packed towers. Pressure drops, power requirements, mass transfer coefficients and liquid residence time distributions are reported for a rotating bed separator. The beds studied were rigid, foamed aluminum, with specific surface areas ranging from 650 to 3000 m^2/m^2. Gravitational fields were varied from 50 to 300g.

31298 (INIS-mf–14055) **Application of the Rutherford backscattering analysis (RBS analysis) for detecting heavy impurity elements in pBN crucible materials. Final report.** Bethge, K.; Meyer, J.D.; Michelmann, R.; Krauskopf, J. Frankfurt Univ. (Germany). Inst. fuer Kernphysik; Bundesministerium fuer Forschung und Technologie, Bonn (Germany). [1992] 2p. (In German). Order Number DE93702130. Source: OSTI; NTIS (US Sales Only); INIS.

By means of the Rutherford backscattering analysis evidence is given of an inhomogeneous depth distribution of the elements C, O, F, Na, Mg, Al, Si, P, S, Cl, Ca, Ti, Cr, Fe, Ni in pBN (pyrolytic boron nitride) materials of crucibles. This inhomogenous distribution is observed both at the original surface and at the surface of inner cracks. In addition, the distribution of the elements is found to differ depending on the spots chosen for analysis. The RBS measurements alone do not yield information on the volume concentration of the elements. (orig.) With 2 refs.

31299 (INIS-mf–14081) **The nuclear reaction analysis (NRA) as a means for detecting carbon in GaAs and in source materials and additives. Final report.** Bethge, K.; Mader, A.; Michelmann, R.; Krauskopf, J.; Thee, P.; Meyer, J.D. Frankfurt Univ. (Germany). Inst. fuer Kernphysik; Bundesministerium fuer Forschung und Technologie, Bonn (Germany). 1991 3p. (In German). Contract BMFT NT2716A;BMFT NT2766A. Order Number DE93702060. Source: OSTI; NTIS (US Sales Only); INIS.

The nuclear reaction ananlysis (NRA) on the basis of the reaction ^{12}C (d,p) ^{13}C is a method allowing the detection and description of both lateral and depth profiles of the presence of carbon in GaAs and in the source materials and additives. The NRA is an absolute method with a detection limit for C of approx. $4x10^{15}$ cm^3. The achievable detection range in depth under the experimental conditions goes from the surface down to 6 μm. Combined with channeling measurements, NRA is capable of identifying the position of carbon in the GaAs crystal lattice, and thus permits to examine the mobility of C in GaAs. (BBR) With 11 refs.

31300 (IS-T–1606) **Enhancement of ion transmission and reduction of background and interferences in inductively coupled plasma mass spectrometry.** Hu, Ke. Ames Lab., IA (United States). 9 Jun 1992. 174p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-82. Order Number DE92018805. Source: OSTI; NTIS; INIS; GPO Dep.

An inductively coupled plasma - mass spectrometer (ICP-MS) (four stages of differential pumping) is described. The large sampling orifice (1.31 mm dia.) improves signals for metal ions and resists plugging. The ion lens deflects ions off center and then back on center into the differential pumping orifice; there is no photon stop in the center. Ion trajectories calculations SIMION show that only those ions that leave the skimmer on center are transmitted, whereas most other lenses used in ICP-MS transmit only ions that leave the skimmer off axis. Background with the Daly detector is 4 counts s^{-1}. This ICP-MS yields low levels of many troublesome polyatomic ions. Signals from refractory metal oxide ions are about 1% of the corresponding metal ion signals. Grounding the first electrode of the ion lens reduces matrix effects to $\lesssim$ 20% loss in signal for Co^+, Y^+ or Cs^+ in presence of 10 mM Sr, Tm or Pb. This latter lens setting causes only 30% loss in sensitivity compared to biassing the first lens. Matrix effects can also be mitigated by re-adjusting the voltage on the first lens with matrix present. Floating the metal cones at various potentials can improve the ion transmission by a factor of at least four to six. Also, floating the cones extends the upper end of linearity. Net result is more sensitivity and higher ion beam intensity than with a grounded skimmer and sampler. Furthermore, mass discrimination can be reduced.

31301 (JINR-R–6-91-123) **Multielemental gamma activation analysis of copper-molybdenum ores and its production of processing using microtron.** Gehrbish, Sh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions); Baatarkhuub, D.; Zhuchko, V.E.; Sodnom, N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 10p. (In Russian). Order Number DE92642842. Source: OSTI; NTIS (US Sales Only); INIS.

A method of multielemental instrumental gamma activation analysis (IGAA) of copper-molybdenum ores and its production of processing using microtron bremsstrahlung is described. Activities of irradiates samples were measured by means of Ge(Li) and HP Ge-detectors. Quantitative determination of elements has been made using standard reference materials. This method allows one to determine concentrations of 10-24 elements in ores and its production of processing. The comparative results IGAA for reference materials of copper molybdenum ores and its production of processing are presented. 14 refs.; 6 tabs.

31302 (JINR-R–6-91-215) **Electrochemical etching of fission fragment tracks in dielectric detectors for use in chemical experiments with transplutonium elements.** Buklanov, G.V.; Maslov, O.D.; Salamatin, L.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 6p. (In Russian). Order Number DE92642843. Source: OSTI; NTIS (US Sales Only); INIS.

The using of electrochemical etching of fission fragment tracks in experiments of the chromatography of the mixture ^{256}Md-^{256}Fm, the quantity determination ^{249}Bk, the uniformity and regularity distribution of the matter layers of the cyclotron targets, analysis samples and targets from ^{249}Bk, ^{249}Cf, ^{248}Cm on the possible radiochemical and isotopic impurities more active on the spontaneous fission is described. By track measurements on the spontaneous fission activity of the target one can reliably determine the ^{252}Cf contents as low as 10^{-3}-10^{-4}%. 10 refs.; 2 figs.

31303 (KFK–4964) **Quantitative determination of elements and identification of compounds of alkali halides by depth-sensitive secondary neutral mass spectrometry.** Schmidt, U.C. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Radiochemie; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Schadstoffbeherrschung in der Umwelt (PSU); Karlsruhe Univ. (T.H.) (Germany). Fakultaet fuer Chemie. Dec 1991. 97p. (In German). Order Number DE93702478. Source: OSTI; NTIS (US Sales Only); INIS.

In the development of a depth-sensitive analysis of saline microparticles, alkali halide salts were studied by plasma-based

SNMS in an effort to check on the quantitative determination of elements and the detection of compounds for the example of salts. (orig./BBR).

31304 (LA-UR-92-1978) **Artificial intelligence and neural networks applied to ion mobility spectrometry.** Bell, S.E.; Mead, W.C. Los Alamos National Lab., NM (United States). [1992]. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206244-1: Symposium on computer-enhanced analytical spectroscopy, Snowbird, UT (United States), 19 Jun 1992). Order Number DE92017508. Source: OSTI; NTIS; GPO Dep.

Pattern recognition techniques trace their history back at least 40 years. Applications of pattern recognition techniques to analytical chemistry originated in the 1950's. Several excellent textbooks, articles, and reviews are available to the interested reader; what follows is an abbreviated discussion of pattern recognition and relevant applications. This information is drawn heavily from the cited sources.

31305 (LA-UR-92-2859) **Quantitative analysis of plutonium and uranium using reversed-phase liquid chromatography and spectrophotometric detection.** Rogers, Y.C.; Hamilton, V.T.; Spall, W.D.; Smith, B.F.; Jackson, D.D. Los Alamos National Lab., NM (United States). 17 Jul 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207102-63: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92040358. Source: OSTI; NTIS; INIS; GPO Dep.

We have developed an efficient method for separating and quantitating uranium and plutonium in dissolver solutions using a CIS reversed-phase column, an eluent containing 2 hydroxyisobtityric acid as a complexant, and 5% methanol at pH 4 with ammonium hydroxide. Postcolumn reaction with Arsenazo III color reagent is followed by an absorbarice measurement at 660 nm. Metal ion interference studies indicated that the combination of the observed separation and the specificity 6f the Arsenazo III for the actinide and lanthanide ions avoided interferences in the direct quantitation of uranium and plutonium by peak integration. Though peak integration for total metal ion content is probably the most direct analytical approach, the metal ions can be collected after separation for further quantitation or other analyses. A possible application is the separation of uranium and plutonium for isotope dilution assay by thermal ionization mass spectrometry or gamma-ray spectroscopy. Only zirconium, hafnium, tantalum, gallium, and aluminum would be expected to coelute in the region of interest.

31306 **On-line process control monitoring system.** O'Rourke, P.E.; Van Hare, D.R.; Prather, W.S. To Dept. of Energy. 22 Jan 1991. USA Patent patent application 7-643,316. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019825. Source: OSTI; NTIS; GPO Dep.

An on-line, fiber-optic based apparatus for monitoring the concentration of a chemical substance at a plurality of locations in a chemical processing system comprises a plurality of probes, each of which is at a different location in the system, a light source, optic fibers for carrying light to and from the probes, a multiplexer for switching light from the source from one probe to the next in series, a diode array spectrophotometer for producing a spectrum from the light received from the probes, and a computer programmed to analyze the spectra so produced. The probes allow the light to pass through the chemical substance so that a portion of the light is absorbed before being returned to the multiplexer. A standard and a reference cell are included for data validation and error checking.

31307 (PNL-SA-21138) **Characterization and monitoring of total organic chloride vapors.** Anheier, N.C. Jr.; Evans, J.C. Jr.; Olsen, K.B. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920791-7: Information exchange meeting on characterization sensors and monitoring, Dallas, TX (United States), 15-16 Jul 1992). Order Number DE92019349. Source: OSTI; NTIS; INIS; GPO Dep.

Chemical sensors are being developed intermediate highly selective and broadly selective methods. PNL is developing an optical-emission based TOCI (total organic chlorinated compounds) sensor (Halosnif) which is capable of measuring TOCI in real time on an extracted gas sample over a wide linear dynamic range. Halosnif employs an atomic emission sensor that is broadly selective for any moderately volatile organic hclorinated vapor but does not distinguish between classes of chlorinated compounds. A rf-induced He plasma is used to excite the chlorine atoms, causing light emission at 837.6 nm. The sensitivity ranges from 1-2 ppM up to at least 10,000 ppM. Field tests were conducted at Tinker AFB in areas of high TCE contamination, in two boreholes at Savannah River, and at Hanford CCl_4 vapor extraction system. This sensor is briefly compared with acoustic wave sensors being developed by SNL (PAWS). 4 figs. (DLC)

31308 (WINCO-11509) **Laboratory studies of the behavior of undissolved solids in both pulsed and packed column extraction systems.** Siemer, D.D. Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States). 18 Apr 1989. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-84ID12435. (CONF-8905122-10: 13. actinide separations conference, Idaho Falls, ID (United States), May 1989). Order Number DE92017464. Source: OSTI; NTIS; INIS; GPO Dep.

A substantial fraction of the finely divided undissolved solid material found in nuclear fuel reprocessing dissolver-product solutions is hydrophobic and tends to "seek" any organic-aqueous interface existing within countercurrent liquid-liquid extraction systems. While passing through pulsed-type columns this material is swept out of the aqueous phase by the combined surface area of the tiny bubbles of dispersed phase. Because these bubbles have a net velocity towards the end of the column where the nominal interface is located, the solids are swept in that direction too. These solids tend to gather in a three-phase "crud" layer at the nominal interface point. At equilibrium, about the same amount breaks off from the crud layer and escapes into the liquid exiting from that end of the column as enters it from the other side. If large enough, the crud layer can even interfere with interface detection and control equipment. In packed-column extraction systems, an additional problem is that feed solids can accumulate within the packing material to the point that the column " floods" or even totally plugs. The keys to preventing solids-related problems is the correct choice of interface level, and with packed columns, the addition of a "pulsing leg" at the bottom of the column. Pulsing packed column systems not only prevents solids from settling onto packing material but it also increases the number of theoretical stages available for extraction. 3 figs., 2 tabs.

31309 (WINCO-11722) **Spectrophotometric determination of hydrogen peroxide in the presence of fluoride.** Delmastro, J.R. Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States). 8 Jul 1991. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-84ID12435. (CONF-9107233-1: 33. Rocky Mountain conference on analytical chemistry, Denver, CO (United States), 28 Jul - 1 aug 1991). Order Number DE92017215. Source: OSTI; NTIS; INIS; GPO Dep.

A simple, rapid method was required for the determination of 0.01 - 0.1M hydrogen peroxide in the presence of 10M HF and in solutions resulting from the dissolution of unirradiated nuclear fuel elements in this dissolvent. Fluoride is a serious interference in the classical spectrophotometric procedure for determining hydrogen peroxide as the yellow-colored Ti(IV)-peroxide complex. It was thought that this interference could be minimized by the addition of a fluoride-complexing metal ion. Zirconium, aluminum, and boron were studied at various metal ion to fluoride mole ratios to determine the optimum conditions for reducing the interference by fluoride when present at the 0.015M and 0.15M levels. All three were effective in reducing the interference, but only at a metal ion to fluoride ratio of one or greater. Although zirconium was the most effective complexer studied, an excess of ZR(IV) decreased the absorbance of the Ti(IV)-peroxide complex. Since excess aluminum does not interfere, a procedure was developed in which two moles of Al(III) are added for each mole of fluoride in the sample aliquot. The color develops rapidly at room temperature and is stable for at least 24 hours. The absorbance is linear over the range 1 ×

10^{-4}M to 1.8 × 10^{-3}M H_2O_2 when measured in 1-cm cuvettes. The method tolerates a variety of metal ions and complexing agents at the 0.02M level.

4002 Inorganic, Organic, and Physical Chemistry

Refer also to citation(s) 30436, 30453, 30483, 30544, 30726, 31324, 31343, 32374, 32525, 32526, 32528

31310 (ANL/CP–75257) **Measurements of $Al(NO_3)_3$ activities in aqueous nitrate solutions.** Chaiko, D.J. (Argonne National Lab., IL (United States)); Fredrickson, D.R.; Difilippo, A.A.; Smidt, S.M.; Vandegrift, G.F.; Tasker, I.R. Argonne National Lab., IL (United States); National Inst. for Petroleum and Energy Research, Bartlesville, OK (United States). [1992]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9208111–1: 12. international conference on chemical thermodynamics and 47th calorimetry conference, Snowbird, UT (United States), 16-21 Aug 1992). Order Number DE92018792. Source: OSTI; NTIS; GPO Dep.

Aluminum nitrate activity coefficient obtained by vapor pressure osmometry are compared with activity coefficients derived from nitric acid extraction measurements using Bromley's correlation. This solvent extraction approach was possible because of the poor extraction of $Al^{3+}(D_{Al} \leq 10^{-3})$ by the chosen solvents. The solvent compositions were 0.25M CMPO (octyl(phenyl)-N,N-diisobutylcarbamoyl-methylphosphine oxide) in tetrachloroethylene (TCE) and 0.25M CMPO with 0.75M tributyle phosphate (TBP) in TCE. In both approaches, nitric acid was used to supress the hydrolysis of Al^{3+}. At high ionic strengths, the two techniques yielded very similar activity coefficients for $Al(NO_3)_3$. However, at intermediate and very low ionic strengths, the two procedures produced activity coefficients which differed considerably from each other. 2 figures, 3 tables, 18 references.

31311 (CONF-921104–1) **Chemical potentials in dilute, multicomponent solutions.** Jonah, D.A. (Tennessee Univ., Knoxville, TN (United States). Dept. of Chemical Engineering); Cochran, H.D. Oak Ridge National Lab., TN (United States). Mar 1992. 42p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From American Institute of Chemical Engineers annual meeting; Miami, FL (United States); 1-6 Nov 1992. Order Number DE92011041. Source: OSTI; NTIS; GPO Dep.

A new theory of dilute, multicomponent solutions has been derived by expansion about the infinite dilution limit. For dilute, binary mixtures to first order, the theory reduces to that of Debenedetti and Kumar. It is shown that models can be derived within the theory by application of conformal solution theory, fluctuation theory, or their combination. These models have been shown to be useful and accurate in test applications to solutions two solid solutes in a supercritical solvent, quantitatively reproducing the cosolute effect for which correlation with the Peng-Robinson equation of state was only partially successful. Other potential applications include solubility of gases in liquids and solid solubilities in entrained supercritical solvents.

31312 (CONF-921186–1) **A neural network approach for the investigation of chemical phenomena.** Darsey, J.A. (Arkansas Univ., Little Rock, AR (United States)); Sumpter, B.G.; Getino, C.; Noid, D.W. Oak Ridge National Lab., TN (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract AC05-84OR21400. Grant DMR-8818412. From 1992 world of neural networks; Houston, TX (United States); 4-7 Nov 1992. Order Number DE92019205. Source: OSTI; NTIS; GPO Dep.

Neural networks are coupled with other computational methods (molecular dynamics, Monte Carlo, etc.) in order to obtain information on the structure and atomistic dynamics of chemical systems. Several aspects of this research are discussed: (1) the prediction of multidimensional potential-energy surfaces from vibrational spectra and constant volume heat capacities, (2) mechanisms and rates for energy flow and redistribution, and (3) prediction of physical properties of organic and polymeric systems. The overall results obtained demonstrate the computational power and accuracies that can be achieved by coupling other computational methods with neural networks, as well as providing intriguing results on the internal dynamics of chemical systems.

31313 (DOE/ER/13551–T1) **[New process modeling, design and control strategies for energy efficiency, high product quality and improved productivity in the process industries].** Wisconsin Univ., Madison, WI (United States). Dept. of Chemical Engineering. [1991]. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER13551. Order Number DE92019522. Source: OSTI; NTIS; GPO Dep.

Highlights are reported of work to date on: resilient design and control of chemical reactors (polymerization, packed bed), operation of complex processing systems (compensators for multivariable systems with delays and Right Half Plane zeroes, process identification and controller design for multivariable systems, nonlinear systems control, distributed parameter systems), and computer-aided design software (CONSYD, POLYRED, expert systems). 15 figs, 54 refs. (DLC)

31314 (DOE/ER/13622–T2) **Structure sensitive reactions over Co, Fe and mixed metal clusters in zeolites: Annual technical progress report.** Suib, S.L. Connecticut Univ., Storrs, CT (United States). 1 Aug 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER13622. Order Number DE92040359. Source: OSTI; NTIS; GPO Dep.

Transient and steady state kinetic studies of structure sensitive reactions of cyclopropane ($c\text{-}C_3H_6$) and hydrogen over zeolites is the first area of this studied. Low level impurity Fe^{3+} ions in zeolites complicate interpretation of spectroscopic and catalytic studies of these systems. We focused our efforts on selectively substituting Fe^{3+} ions in the frameworks of various zeolites to understand their role in catalytic reactions such as with $c\text{-}C_3H_6$ and H_2. These studies led to isomorphous substitution of other ions like B^{3+} and their use in isomerization of n-butenes to isobutylene. The third area of research involves the synthesis, characterization and catalysis of a new class of molecular sieve manganese oxide tunnel structure materials.

31315 (DOE/ER/13772–5) **Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992.** Harold, M.P.; Conner, C.W. Massachusetts Univ., Amherst, MA (United States). Dept. of Chemical Engineering. Jul 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER13772. Order Number DE92019745. Source: OSTI; NTIS; GPO Dep.

Objectives were to formulate kinetic models/mechanistic sequences, and to develop bifunctional catalysts for selective oxidation of hdyrocarbons. Efforts are reported this year on 3 items: development of Fourier transform infrared emission spectroscopy to monitor near infrared (ir) under reaction conditions (ethylene oxidation on V_2O_5); kinetics study of methanol oxidation on supported Pt catalysts (methanol-rich feed the CO_2 yield exhibits a maximum at an intermediate temperature); and comparative kinetics study of CO oxidation on Pt, Pd, and Rh. The ir spectra of V_2O_5 show a correlation between the ir features and the degree of surface oxidation. 4 figs. (DLC)

31316 (IFP–39478) **Synthesis, characterization and reactivity of some lanthanide organometallics.** Marchal, N. Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison (France); Paris-6 Univ., 75 (France). Dec 1991. 184p. (In French). Order Number DE93701323. Source: OSTI; NTIS (US Sales Only); INIS.

Organo lanthanides with reactive metal-carbon bonds are obtained by direct synthesis of the metal (powder) and a hydrocarbon in ether medium, like with alkali metals. Two types of synthesis are envisaged: formation of covalent bonds by opening cycles, only biphenylene is reactive enough in regard to ytterbium and samarium, these organometallic compounds can also be prepared by the classical way, i.e. reaction of 2.2'-dilithio biphenyl on rare earth halogenides and coupling of 6.6-dimethylfulvene leading to dicyclopentadienyl compounds with Sm and Yb. The reactivity of these complexes is studied by catalysis of ethylene polymerization.

31317 (K/ETO–93) **Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6.** Trowbridge, L.D.; Angel, E.C. Oak Ridge K-25 Site, TN (United States). UEO Enrichment Technical Operations Div. Jul 1992. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OT21400. Order Number DE92019277. Source: OSTI; NTIS; GPO Dep.

The DOE gaseous diffusion plant complex makes extensive use of CFC-114 as a primary coolant. As this material is on the Montreal Protocol list of materials scheduled for production curtailment, a substitute must be found. In addition to physical cooling properties, the gaseous diffusion application imposes the unique requirement of chemical inertness to fluorinating agents. A series of studies has therefore been undertaken to evaluate the gas-phase chemical reactivity of potential alternate coolants. This report examines the reactivity of perfluorocyclobutane (C-C_4F_8) with UF_6 and F_2 at selected reference conditions (approximately 10 Torr partial pressure of each reactant at 150°C). At the reference conditions, a very slight degree of reactivity was observed with F_2, but much less than the observed reactivity of the reference coolant, CFC-114. No reaction was observed with UF_6. A limited number of experiments was conducted at higher temperature, providing a first estimate of the rate of increase of reaction rate with increased temperature.

31318 (LA-UR–92-1953) **Analysis of IMS spectra using neural networks.** Bell, S.E. Los Alamos National Lab., NM (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206243–2: Workshop on ion mobility spectrometry, Ruidoso, NM (United States), 22-26 Jun 1992). Order Number DE92017511. Source: OSTI; NTIS; GPO Dep.

Ion mobility spectrometry (IMS) has been used for over 20 years, and IMS coupled to gas chromatography (GC/IMS) has been used for over 10 years. There still is no systematic approach to IMS spectral interpretation such as exists for mass spectrometry and infrared spectrometry. Neural networks, a form of adaptive pattern recognition, were examined as a method of data reduction for IMS and GC/IMS. A wide variety of volatile organics were analyzed using IMS and GC/IMS and submitted to different networks for identification. Several different networks and data preprocessing algorithms were studied. A network was linked to a simple rule-based expert system and analyzed. The expert system was used to filter out false positive identifications made by the network using retention indices. The various network configurations were compared to other pattern recognition techniques, including human experts. The network performance was comparable to human experts, but responded much faster. Preliminary comparison of the network to other pattern recognition showed comparable performance. Linkage of the network output to the rule-based retention index system yielded the best performance.

31319 (POEF-T–3599) **Laboratory measurement of miscibility and pressure/temperature relationships of n-C_4F_{10}/CFC-114 mixtures.** Orlett, M.J. Martin Marietta Energy Systems, Inc., Piketon, OH (United States). 15 Jul 1992. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-76OR00001. Order Number DE92019143. Source: OSTI; NTIS; INIS; GPO Dep.

n-Perfluorobutane (n-C_4F_{10}) has been identified as a potential candidate replacement for dichlorotetrafluoroethane ($C_2Cl_2F_4$-commonly referred to as CFC-114) which is the process coolant in the gaseous diffusion plants. Although every effort will be taken to maintain separate coolants during the CFC-114 replacement project, it is possible that mixtures of the two coolants will occur as a result of inadvertent mixing and/or residual presence from incompletely removed CFC-114. A laboratory system designed to mimic conditions found in the plant process coolant systems was constructed. Pure CFC-114, n-C_4F_{10}, and 25/75, 50/50, and 75/25 weight mixtures of the two coolants were tested in the system at various power and coolant water flow levels to determine temperature/pressure characteristics. Results indicate that pressures of the mixtures fall between those of the pure coolants and no positive deviation effects (high pressures) were observed. Visual observations and analytical data also show that the two coolants are completely miscible.

4004 Electrochemistry

Refer also to citation(s) 30424, 31141, 32365

31320 (BDX–613-3417) **Acid copper sulfate plating bath: Control of chloride and copper: Final report.** Borhani, K.J. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019473. Source: OSTI; NTIS; GPO Dep.

Plated-through holes in high-reliability printed wiring boards require a ductile copper plate of uniform consistency. The level of control of the chemical constituents in the electroplating solutions dictates the physical properties of the copper plate. To improve the control of the chemical bath constituents, in-situ methods for electrochemically determining copper and chloride in acid copper sulfate baths were developed. A solid-state ion-selective electrode was used for the chloride ion and proved to be more reproducible than conventional silver chloride turbidimetric methods. The use of a copper solid-state ion-selective electrode in-situ was also successful in this application.

31321 (CONF-9207124–1) **Model for impedance of an ionic conductor sandwiched between blocking electrodes.** Wang, J.C. Oak Ridge National Lab., TN (United States). 24 Jun 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 2. international symposium on electrochemical impedance spectroscopy; Santa Barbara, CA (United States); 12-17 Jul 1992. Order Number DE92017812. Source: OSTI; NTIS; GPO Dep.

The simplest model for the impedance of an ionic conductor sandwiched between two blocking electrodes is a resistor in series with a capacitor (rc pair) representing the bulk material and the conductor-electrode interface, respectively, and a second capacitor parallel to the rc pair representing the electronic dielectric response of the system. In practice, to describe the experimental data satisfactorily, one needs to replace the interface capacitor with a constant-phase-angle (CPA) element and to add a non-Debye dielectric element parallel to the resistor to represent the local ionic movement. In this paper, some of the existing physical models for the CPA and non-Debye dielectric elements are discussed, and an example is presented for analyzing the impedance data using the resultant circuit model.

31322 (UCRL-JC–108867) **Aqueous phase oxidation techniques as an alternative to incineration.** Gray, L.W.; Adamson, M.G.; Hickman, R.G.; Farmer, J.C.; Chiba, Z.; Gregg, D.W.; Wang, F.T. Lawrence Livermore National Lab., CA (United States). Mar 1992. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920527–8: 1992 incineration conference, Albuquerque, NM (United States), 11-14 May 1992). Order Number DE92019501. Source: OSTI; NTIS; INIS; GPO Dep.

The Lawrence Livermore National Laboratory (LLNL) has three aqueous phase techniques under development for oxidation of high value or high risk waste steams. One is direct electrochemical oxidation and one is mediated electrochemical oxidation utilizing regenerable, strongly oxidizing cations such as Ag(II), Co (III), Ce(IV), etc. These cations can either attack oxidizable materials directly and/or indirectly via first reacting with water to generate OH radicals which then attack the oxidizable materials. The third system utilizes H_2O_2 and UV light to generate OH radicals directly which in turn attack the oxidizable materials. All systems have the advantage of a chemical off-switch in that when the power is turned off, the reaction quickly subsides. All systems operate with low concentrations (typically <5 wt %) of oxidizable materials, therefore, the stored energy for possible run-away reactions is very low. 15 figures, 22 references.

4005 Photochemistry

Refer also to citation(s) 31322, 31324

31323 (DOE/ER/14205–1) **Photochemical dynamics of surface oriented molecules: Progress report, August 1, 1991–July 31, 1992.** Ho, W. Cornell Univ., Ithaca, NY (United States). Lab. of

Atomic and Solid State Physics. [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER14205. Order Number DE92019813. Source: OSTI; NTIS; INIS; GPO Dep.

The period 8/01/91-7/31/92 is the first year of a new project titled "Photochemical Dynamics of Surface Oriented Molecules", initiated with DOE Support. The main objective of this project is to understand the dynamics of elementary chemical reactions by studying photochemical dynamics of surface-oriented molecules. In addition, the mechanisms of photon-surface interactions need to be elucidated. The strategy is to carry out experiments to measure the translational energy distribution, as a function of the angle from the surface normal, of the photoproducts by time-of-flight (TOF) technique by varying the photon wavelength, intensity, polarization, and pulse duration. By choosing adsorbates with different bonding configuration, the effects of adsorbate orientation on surface photochemical dynamics can be studied.

4006 Radiation Chemistry

31324 (DOE/ER/00038–3516) **Radiation Laboratory, University of Notre Dame quarterly report, April 1–June 30, 1992.** Notre Dame Univ., IN (United States). Radiation Lab. 23 Jun 1992. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76ER00038. (NDRL–3516;Q–140). Order Number DE92019518. Source: OSTI; NTIS; GPO Dep.

This report contains forty-nine abstracts representing research at the University of Notre Dame's Radiation Laboratory. Programs in radiation chemistry and photochemistry are summarized.(JL)

31325 (JAERI-M–92-012, pp. 116-136) **Studies on formation and transport of volatile iodine species in radiation field.** Naritomi, M. (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Nagai, H.; Okagawa, S.; Saeki, M. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

In a late stage of a severe LWR accident, volatile iodine species are mainly formed by radiation-induced reactions in the water pool of reactor containment, and will be transported by natural and/or forced convection through gas/liquid interface into the gas phase, and then to the environment. The prediction of formation and transport models are examined in a late stage of a severe LWR accident. In order to direct our efforts to elucidate physical effects of natural and/or forced convection conditions on formation and transport of volatile iodine species, the test programs with a dynamic flow type VITA (Volatile Iodine Test Apparatus) system are in progress in JAERI. (author).

31326 (JAERI-M–92-012, pp. 137-151) **Effect of boiling upon radiolysis of iodide solution.** Karasawa, H. (Hitachi Ltd., Ibaraki (Japan). Energy Research Lab.); Endo, M.; Tagawa, H.; Takahashi, M.; Ibe, E. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The effect of void fractions on oxidation of iodide ions was examined in γ-radiolysis of iodide solution. All hydrogen produced by radiolysis of water transferred to gas phase at void fractions of about 1 and 10% at 293 and 373K, respectively. At these void fractions, iodide ions were oxidized to iodate ions during irradiation with iodide concentration below 10^{-5} mol/l. This indicated that the fraction of OH radicals reacted with iodide ions was increased with the void fractions, because the reactivity between OH radicals and hydrogen was decreased. Analytical model was developed based on chemical reactions and mass transfer. The reaction scheme was composed of 35 reactions for pure water system and 89 reactions for iodide solution system. The analytical model could estimate the experimental results within ±20% of experimental values. (author).

31327 (JAERI-M–92-012, pp. 152-161) **Measurement on the rate of some reactions relevant to iodine chemistry in the aqueous phase.** Shiraishi, H. (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Okuda, H.; Morinaga, Y.; Ishigure, K. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The equilibrium quotient for $HOI\cdot^- \rightleftarrows I\cdot + OH^-$ was measured to be about 0.2 mol dm^{-3} at 20degC, which, combined with other thermodynamic data, led to an estimate that the rate constant $k(HOI\cdot \rightarrow OH\cdot + I^-)$ must be smaller than 20 s^{-1} unlike previous evaluation by Buechler and Buehler. In near neutral conditions the reaction between H_2O_2 and the iodine species in the oxidation state between 0 and +1 was found to be explained in terms of two pathways, one via OI^- with $k(OI^- H_2O_2)$ of $(6.6 \pm 2.0) \times 10^7$ dm^3 mol^{-1} s^{-1} at 25degC and another via I_2OH^- with $k(I_2OH^- + H_2O_2)/Q_{12}$ of $(2.0 \pm 0.6) \times 10^6$ dm^6 mol^{-2} s^{-1} at 25degC, where Q_{12} stands for the equilibrium quotient for $I_2OH^- \rightleftarrows HOI + I^-$. The latter reaction has not been assigned previously. The rate constant $k(I_2 + OH^- \rightarrow I_2OH^-)$ was estimated to be larger than 2×10^9 dm^3 mol^{-1} s^{-1} in agreement with previous presumption by others. (author).

31328 (JAERI-M–92-017) **Investigation on the gas-phase radiolysis of metal complexes.** Nakase, Yoshiaki (Japan Atomic Energy Research Inst., Neyagawa, Osaka (Japan). Osaka Lab. for Radiation Chemistry). Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 38p. (In Japanese). Order Number DE93703325. Source: OSTI; NTIS; INIS.

Gas-phase radiolysis of metal carbonyls has been performed. These carbonyls with iron, chromium and cobalt are sublimed easily by heating under atmospheric condition, and formed fine powder by gamma-ray-or electron-irradiation. Chemical compositions of fine powders prepared by electron beam irradiation are estimated as metal oxide after physical analysis such as microscopic observation, particle sizing, thermal and chemical analysis. These metal oxides thus obtained contain CO_2, H_2O, and some carbonic compounds, and they are removed easily by heating up to 400degC. (author).

4007 Radiochemistry and Nuclear Chemistry

Refer also to citation(s) 30869, 30876, 30946, 30975, 31227, 31243, 31290, 31302, 31790, 31792, 31793, 31800, 31812, 32574

31329 (CNIC–00471) **Preparation of rT_3 in human serum ria kit.** Zhang Peixuan (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Han Shiquan; Zhang Liling. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 9p. (In Chinese). (IAE–0090.). Order Number DE93601273. Source: OSTI; NTIS (US Sales Only); INIS.

A method for the measurement of rT_3 in serum by radioimmunoassay is presented. The double antibody plus polyethylene glycol was used as separating reagent. The method is simple, precise and sensitive. Serum rT_3 values of normal (n = 61) were 47.7 ± 11.34 x 10^{-8} g/L (X-bar ± SD). Patients with hyperthyroidism (n = 8) serum rT_3 values were 272.2 ± 91.1 x 10^{-8} g/L (X-bar ± SD) and patients with hypothyroidism (n = 2) serum rT_3 values were 11.4 ± 8.3 x 10^{-8} g/L (X-bar ± SD). It appears to be a useful diagnostic procedure for thyroid diseases.

31330 (CONF-920808–5) **Flowsheet for ^{63}Ni production.** Williams, D.F.; Knauer, J.B.; O'Kelley, G.D.; Wiggins, J.T.; Porter, C.E. Oak Ridge National Lab., TN (United States). [1992]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From American Institute of Chemical Engineers summer national meeting; Minneapolis, MN (United States); 9-12 Aug 1992. Order Number DE92019282. Source: OSTI; NTIS; INIS; GPO Dep.

The production of large quantities of high specific activity ^{63}Ni (>10Ci/g) requires both a highly enriched ^{62}Ni target and a long irradiation period at high neutron flux. Trace impurities in the nickel and associated target materials are also activated and account for a significant fraction of the discharged activity and essentially all of the gamma activity. While most of these undesirable activation products (mainly transition metals) can be easily removed as chloride complexes during anion exchange, chromium, present as ^{51}Cr, and manganese, present as ^{54}Mn, are exceptions and require solvent extraction of the in-cell product to achieve the desired purity. In addition to summarizing the current development and production experience, optimized flowsheets are discussed.

31331 (DOE/ER/61006–T1) **Synthesis of tracers using automated radiochemistry and robotics: Progress report, April 1, 1992–July 31, 1992.** Dannals, R.F. Johns Hopkins Univ., Baltimore, MD (United States). School of Medicine. Jul 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER61006. Order Number DE92019525. Source: OSTI; NTIS; INIS; GPO Dep.

Synthesis of high specific activity radiotracers labeled with short-lived positron-emitting radionuclides for positron emission tomography (PET) often requires handling large initial quantities of radioactivity. High specific activities are required when preparing tracers for use in PET studies of neuroreceptors. A fully automated approach for tracer synthesis is highly desirable. This proposal involves the development of a system for the Synthesis of Tracers using Automated Radiochemistry and Robotics (STARR) for this purpose. While the long range objective of the proposed research is the development of a totally automated radiochemistry system for the production of major high specific activity ^{11}C-radiotracers for use in PET, the specific short range objectives are the automation of ^{11}C-methyl iodide ($^{11}CH_3I$) production via an integrated approach using both radiochemistry modular labstations and robotics, and the extension of this automated capability to the production of several radiotracers for PET (initially, ^{11}C-methionine, 3-N-[^{11}C-methyl]spiperone, and [^{11}C]-carfentanil).

31332 (DOE/RW–0184-R1-Vol.3) **Characteristics of potential repository wastes: Volume 3, Appendix 3A, ORIGEN2 decay tables for immobilized high-level waste; Appendix 3B, interim high-level waste forms.** Oak Ridge National Lab., TN (United States). Jul 1992. 218p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–2217-Vol.3). Source: INIS; OSTI (Free of Charge).

This appendix presents the results of decay calculations using the ORIGEN2 code to determine the radiological properties of canisters of immobilized high-level waste as a function of decay time for decay times up to one million years. These calculations were made for the four HLW sites (West Valley Demonstration Project, Savannah River Site, Hanford Site, and Idaho National Engineering Laboratory) using the composition data discussed in the HLW section of this report. Calculated (α,n) neutron production rates are also shown.

31333 (FRCEA-TH–363) **Study of the extraction and the purification of americium and trivalent actinides contained in effluents with supported liquid membranes.** Guillou, P. CEA Centre d'Etudes de Bruyeres-le-Chatel, 91 (France); Paris-11 Univ., 91 - Orsay (France). Dec 1990. 180p. (In French). Order Number DE93701321. Source: OSTI; NTIS (US Sales Only); INIS.

The supported liquid membrane technique is studied and developed for americium recovery from uranium or plutonium matrices and decontamination of liquid radioactive wastes. First tests on uranium-nickel solutions with a flat membrane showed the easiness of the operation and the efficiency of the process. Acid-resistant (10 N), interchangeable elements with hollow fibers, are developed and also a computerized automatic device. The different tests on americium solutions demonstrate the feasibility and the reliability of the system. Influence of various parameters on transfer kinetics is investigated.

31334 (INIS-mf–13347, pp. 30) **Radon and radon daughter products: Their chemistry after alpha-decay.** Thibodeau, D. (Carleton Univ., Ottawa, ON (Canada). Dept. of Chemistry); Wiles, D.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/chemisorption; DAUGHTER PRODUCTS; DEPOSITION; RADON 220; CHEMISORPTION

31335 (JAERI-M–92-012, pp. 81-96) **Aqueous solution of iodide under gamma ray irradiation: Fixation of iodide by adding soluble silver salt.** Ishiwatari, Nasumi (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment). Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

An experiment on the fixation of iodide by adding soluble silver salt in the aqueous solution under the gamma ray irradiation was performed to establish a method for confinement of methyl iodide formation during the severe accident of a LWR plant. The formation of methyl iodide in the water phase of sump tank in the reactor pressure vessel containment building was presumed in this study by the reason of being of much obscure parts on the formation mechanism and transfer behavior of the methyl iodide under the severe accident conditions. And the separate effects tests on the chemical behavior of silver iodide and methyl iodide were performed under the gamma ray irradiation. Though the high dependence on the accident events sequence or the plant construction for the formation and transfer behavior of the fission products iodine was inferred, it was shown from the experimental results as above that the method to confine the formation of the methyl iodide by adding the soluble silver salt into the sump tank water at the accident is desirable. (author).

31336 (JAERI-M–92-012, pp. 97-115) **Batch-type tests on formations of volatile iodine species from aqueous iodide solution under ^{60}Co γ-rays irradiation.** Naritomi, M. (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Nagai, H.; Okagawa, S.; Ishiwatari, N. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Test programs with a dynamic flow type VITA (Volatile Iodine Test Apparatus) system are in progress in JAERI for elucidating the radiation-induced formations of volatile iodine species and their transport behavior under natural and/or forced convection conditions. In order to survey dominant factors affecting the radiation-induced reactions of volatile iodine formation in advance of the VITA programs, batch tests were carried out using closed pyrex-glass ampules(200ml), in which 100ml of aqueous iodide solution was filled with organic and various chemical additives. The test solutions were irradiated by ^{60}Coγ - rays at 10 kGy/h (10^6 rad/h) for one hour. The formations of volatile iodine species (I_2, CH_3I and so on) from aqueous iodide solution were measured. The test results and discuss mechanisms of volatile iodine, especially methyl iodide, formations are described. (author).

31337 (JAERI-M–92-012, pp. 181-194) **Volatile organic iodine formation by surface processes.** Deane, A.M. (AEA Thermal Reactor Services, Harwell (United Kingdom). Materials and Chemistry). Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

In order to predict the contribution to iodine release following a reactor fault, measurements of volatile organic iodine formation from adsorbed I^- ions have been made on a number of surfaces over a wide range of concentrations. The results have been used to develop a semi-mechanistic computer model based on surface reactions, with which the formation of volatile organic iodine species can be predicted. The surface reactions chosen were all reasonable reactions, known to occur on catalyst surfaces which have been studied elsewhere. A second volatile species, identified as inorganic iodine, was also produced by surface reactions. (author).

31338 (JAERI-M–92-012, pp. 230-246) **ACE bench-scale studies of iodine volatility and interaction with epoxy painted**

surfaces. Evans, G.J. (Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment); Palson, A.S. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The effects of pH, temperature, gamma irradiation, initial speciation and epoxy paint on iodine behaviour were studied in bench-scale experiments in support of the Advanced Containment Experiments (ACE) Phase B research program. The water/air partition coefficient and the retention of iodine on submerged epoxy painted coupons were evaluated. Additional information was obtained through radiochemical measurements of the aqueous and gas phase iodine speciation. Following irradiation, the overall iodine volatility depended strongly on pH, however, it did not differ significantly between solutions prepared with I_2 and I^-. At 80degC, extensive organic iodine formation occurred in unirradiated basic-solutions containing epoxy painted coupons, resulting in up to 10 % of the liquid phase iodine being converted to higher molecular weight organic iodides of low volatility. In a related study, the adsorption of I_2 (g) on epoxy painted coupons at 80degC was investigated. Although the initial rate of deposition appeared to be limited by gas phase mass transfer, the rate over the longer term was suggestive of a slower chemical reaction. Desorption of the deposited iodine was extremely slow, indicating that the majority of the iodine on the epoxy was irreversibly bound. A semi-empirical model was developed and found to represent reasonably both the present results and those of other studies. (author).

31339 (JAERI-M–92-012, pp. 249-263) **The Advanced Containment Experiments (ACE) Radioiodine Test Facility experimental program.** Kupferschmidt, W.C.H. (Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment); Evans, G.J.; Jobe, D.J.; Melnyk, A.J.; Portman, R.; Palson, A.; Sanipelli, G.G. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

Results of the Advanced Containment Experiments (ACE) Radioiodine Test Facility (RTF) program are reported. This study consisted of four intermediate-scale experiments that investigated the effects of radiation, pH, surfaces and initial iodine speciation on iodine behaviour. The tests revealed that, in high radiation fields, the long-term volatility of iodine is independent of the initial iodine speciation (CsI, I_2, CH_3I). This is presumably because radiolytic reactions interconvert aqueous iodine species; I^- was the predominant aqueous iodine species after an absorbed dose of about 30-40 kGy. Tests at pH 9 and 5.5 demonstrated that iodine volatility increased significantly with decreasing pH. In addition, this study demonstrated that containment surfaces can play an important role in determining iodine volatility, gas and aqueous phase iodine speciation, and surface adsorption. (author).

31340 (JAERI-M–92-012, pp. 298-310) **The oxidation of cesium iodine aerosols during hydrogen combustion.** Kupferschmidt, W.C.H. (Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment); Buttazoni, J.B.; Evans, G.J.; Harris, D.R.; Greig, D.R.; Koroll, G.W.; Sanipelli, G.G. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The effects of hydrogen deflagrations on suspended CsI aerosols have been studied in a series of tests in the Containment Test Facility. In a 10 vol% steam environment, CsI oxidation was not observed, even in near-stoichiometric hydrogen-air-steam mixtures. In dry mixtures, significant yields of gas phase I_2 (15 %) were observed at high hydrogen concentrations. High iodine:cesium ratios in collected aerosol samples and increased organic iodine yields provided additional evidence of CsI oxidation. These results are discussed in terms of the possible role that steam may have on the chemistry of CsI aerosols during hydrogen combustion. (author).

31341 (JAERI-M–92-012, pp. 396-413) **Advanced Containment Experiments (ACE): Evaluation of pre-test code calculations of iodine behaviour in the Radioiodine Test Facility.** Fluke, R.J. (Ontario Hydro, Toronto, ON (Canada)); Edward, J.B.; Weaver, K.R.; Evans, G.J. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

As part of the international Advanced Containment Experiments (ACE), pre-test code predictions were performed to simulate iodine behaviour in a set of experiments in the Radioiodine Test Facility (RTF). The experiments were conducted using an epoxy painted vessel, and variables included solution chemistry, initial iodine species and radiation. The codes predicted consistently low airborne iodine fractions (< 0.25 %) and significant radiation and pH effects, including adsorption onto the painted surfaces. The subsequent experiments qualitatively confirmed these effects. However, the codes differed in predicting the detailed iodine speciation, the magnitude of radiation effects, and whether surface adsorption was predominantly above or below the water level. The reasons for the differences were inconclusive because the code input was based on inconsistent assumptions about test operations and physical parameters. In a follow-up code exercise, these input assumptions were standardised so that differences in the chemistry models could be discerned better. It is concluded that the codes are well advanced, but have incomplete models to predict the effects of painted surfaces and organic materials on iodine behaviour in a radiation field. (author).

31342 (JAERI-M–92-012, pp. 446-460) **The kinetic behaviour of iodine and cesium under severe accident conditions.** Buron, J.M. (Universidad Politecnica de Madrid (Spain)); Fernandez, S.; Alonso, A. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

A kinetic study has been performed with the aim of verifying the validity of the equilibrium assumption. The most important chemical reactions of iodine and cesium in a steam/hydrogen environment, including a surface reaction, have been chosen. The following step has been the estimation of the rate constants of the involved reactions through the Activated Complex Theory. The main problem encountered in this calculation has been the estimation of the activation energies, since these parameters are normally obtained by experimentation. In any case, experimental data were used when they exist. After this, the concept of the ideal tubular chemical reactor was introduced to establish dynamic balance equations leading to systems of differential equations from which the distribution of iodine and cesium species in a flowing pipe that simulates the primary circuit can be obtained. This kinetic model has been applied to analyze several cases corresponding to PHEBUS-FP and severe fuel damage experiments. It can be pointed out that equilibrium values have not been achieved at the end of the pipe in most of cases and the surface reactions can play an important role in the phenomenology of severe accidents. (author).

4008 Combustion, Pyrolysis, and High-Temperature Chemistry

Refer also to citation(s) 30804, 30866, 31158, 31159, 31612, 31631, 31635

31343 (ANL/CP–72683) **Flash photolysis-shock tube studies of bimolecular reactions.** Michael, J.V. Argonne National Lab., IL (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9206180–2: 14. combustion research meeting; Department of Energy-Basic Energy Sciences (DOE-BES) combustion research meeting, Tahoe City, CA (United States); Lake Geneva, WI (United States), 14-17 Jun 1992; 28-31 may 1991; CONF-9105162–1). Order Number DE92015190. Source: OSTI; NTIS; GPO Dep.

Three experiments were completed during the past year. The rate constant for the reaction $O + CH_3Cl \rightarrow OH + CH_2Cl$ at 556 to 1485 K, was determined to be $k_1 = 2.57 \times 10^{-11}T^{0.31}\exp(-5633\ K/T)cm^3/molecule{\cdot}s$. The rate constant for the reaction $N + NO \rightarrow N_2 + O$ at 1251-3152 K, was determined to be $k_3 = (3.7\pm0.9)\times10^{-11}cm^3/molecule{\cdot}s$. The pyrolysis of CH_3Cl can be represented by the Arrhenius equation, $k_5 = 9.6\times10^9\exp(-27449\ K/T)s_{-1}$. The pyrolysis photolysis-shock tube technique was used to study the $O + CH_3$ reaction at 1609 to 1972 K; fits to O-atom profiles gives the T-independent rate constant $k_6 = (1.4\pm0.3)\times10^{-10}cm^3/molecule{\cdot}s$. 1 fig., 14 refs. (DLC)

31344 (DOE/ER/13728–4) **Analysis of transport mechanisms in dense fuel droplet sprays: Final report.** Kleinstreuer, C. North Carolina State Univ., Raleigh, NC (United States). Dept. of Mechanical and Aerospace Engineering. May 1991. 38p. Sponsored by USDOE, Washington, DC (United States); North Carolina State Government, Raleigh, NC (United States). DOE Contract FG05-87ER13728. Order Number DE92018716. Source: OSTI; NTIS; GPO Dep.

This report deals with numerical analyses of fluid mechanics, heat transfer, mass transfer and particle dynamics of interacting spheres and vaporizing droplets in a linear array or on a 1-D trajectory. Available finite element software has been modified and extended to solve several case studies including closely spaced monodisperse spheres with or without blowing; closely spaced vaporizing fuel droplets; and dynamically interacting vaporizing fuel droplets on a 1-D trajectory. Axisymmetric laminar flow has been assumed for three statically or dynamically interacting spherical solids and vaporizing droplets. Emphasis in this work is evaluating the effects of key system parameters, such as free stream Reynolds number, interparticle spacings, liquid/gas-phase viscosity ratio and variable fluid properties, on interfacial transfer processes and on the particle Nusselt number, vaporization rate and drag coefficient. Computer-generated correlations between integral quantities and system parameters were postulated for blowing spheres and vaporizing droplets. In addition to initial Reynolds number and droplet spacings, variable fluid properties, liquid-phase heating and internal droplet circulation have strong effect on the dynamic behavior of multi-droplet systems. While the lead droplet is most significantly affected by all key parameters, the second and third droplet causes distinct interaction effects which are largely dependent on initial droplet spacings. Applications include spherical-structure/fluid-flow interactions, as well as interacting vaporizing droplets in different sprays related to propulsion systems, irrigation, spray coating, etc. Focusing on fuel droplet sprays, results of the dynamic multi-droplet study can assist in better atomizers and combustion chamber designs which may lead to improved combustion efficiencies, smaller/lighter systems, and reduced pollutant emissions.

31345 (DOE/ER/25027–6) **Studies in nonlinear problems of energy: Progress report, January 1, 1992–December 31, 1992.** Matkowsky, B.J. Northwestern Univ., Evanston, IL (United States). Jul 1992. 55p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER25027. Order Number DE92018551. Source: OSTI; NTIS; GPO Dep.

Emphasis has been on combustion and flame propagation. The research program was on modeling, analysis and computation of combustion phenomena, with emphasis on transition from laminar to turbulent combustion. Nonlinear dynamics and pattern formation were investigated in the transition. Stability of combustion waves, and transitions to complex waves are described. Combustion waves possess large activation energies, so that chemical reactions are significant only in thin layers, or reaction zones. In limit of infinite activation energy, the zones shrink to moving surfaces, (fronts) which must be found during the analysis, so that (moving free boundary problems). The studies are carried out for limiting case with fronts, while the numerical studies are carried out for finite, though large, activation energy. Accurate resolution of the solution in the reaction zones is essential, otherwise false predictions of dynamics are possible. Since the the reaction zones move, adaptive pseudo-spectral methods were developed. The approach is based on a synergism of analytical and computational methods. The numerical computations build on and extend the analytical information. Furthermore, analytical solutions serve as benchmarks for testing the accuracy of the computation. Finally, ideas from analysis (singular perturbation theory) have induced new approaches to computations. The computational results suggest new analysis to be considered. Among the recent interesting results, was spatio-temporal chaos in combustion. One goal is extension of the adaptive pseudo-spectral methods to adaptive domain decomposition methods. Efforts have begun to develop such methods for problems with multiple reaction zones, corresponding to problems with more complex, and more realistic chemistry. Other topics included stochastics, oscillators, Rysteretic Josephson junctions, DC SQUID, Markov jumps, laser with saturable absorber, chemical physics, Brownian movement, combustion synthesis, etc.

42 ENGINEERING

Refer also to citation(s) 30927, 30928, 30929, 30930, 31285

31346 (UCRL–53868-91) **Engineering research, development and technology: Thrust area report FY 91.** Lawrence Livermore National Lab., CA (United States). [1991]. 272p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019752. Source: OSTI; NTIS; INIS; GPO Dep.

The mission of the Engineering Research, Development, and Technology Program at Lawrence, Livermore National Laboratory (LLNL) is to develop the technical staff and the technology needed to support current and future LLNL programs. To accomplish this mission, the Engineering Research, Development, and Technology Program has two important goals: (1) to identify key technologies and (2) conduct high quality work to enhance our capabilities in these key technologies. To help focus our efforts, we identify technology thrust areas and select technical leaders for each area. The thrust areas are integrated engineering activities and, rather than being based on individual disciplines, they are staffed by personnel from Electronics Engineering, Mechanical Engineering, and other LLNL organizations, as appropriate. The thrust area leaders are expected to establish strong links to LLNL program leaders and to industry; to use outside and inside experts to review the quality and direction of the work; to use university contacts to supplement and complement their efforts; and to be certain that we are not duplicating the work of others. The thrust area leader is also responsible for carrying out the work that follows from the Engineering Research, Development, and Technology Program so that the results can be applied as early as possible to the needs of LLNL programs. This annual report, organized by thrust area, describes activities conducted within the Program for the fiscal year, 1991. Its intent is to provide timely summaries of objectives, theories, methods, and results.

4202 Facilities, Equipment, and Techniques

Refer also to citation(s) 30536, 30670, 30715, 30774, 30917, 31125, 31233, 31625, 31640, 32062, 32348, 32562

31347 (CEA-CONF–10843) **Intelligent perception control based on a blackboard architecture.** Taibi, I.; Koenig, A.; Vacherand, F. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 8p. (CONF-9106387–: International Conference on Industrial Engineering Applications of Artificial Intelligence and Expert Systems, Hawaii, HI (United States), 2-5 Jun 1991). Order Number DE92566721. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper, is described the intelligent perception control system GESPER which is presently equipped with a set of three cameras, a telemeter and a camera associated with a structured strip light. This system is of great interest for all our robotic applications as it is capable of autonomously planning, triggering acquisitions, integrating and interpreting multisensory data. The GESPER architecture, based on the blackboard model, provides a generic development method for indoor and outdoor perception.

The modularity and the independence of the knowledge sources make the software evolving easily without breaking down the architecture. New sensors and/or new data processing can be integrated by the addition of new knowledge sources that modelize them. At present, first results are obtained in our testbed hall which simulates the nuclear plant as gives similar experimental conditions. Our ongoing research concerns the improvement of fusion algorithms and the embedding of the whole system (hardware and software) on target robots and distributed architecture.

31348 (CEA-CONF--10941) **Path tracking control of mobile robots with techniques based on the use of curved abscissa.** Micaelli, A. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Technologies Avancees. 1992. 44p. (In French). (CONF-9203187--: GRECO Automation - Meeting of the robotics group, Paris (France), 5-6 Mar 1992). Order Number DE93701257. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes a particular method, developed by the CEA, for the control of mobile robot trajectories based on Cornu's spiral, i.e; sections of trajectories with constant curvature. New approaches are discussed for methods more convenient.

31349 (CNIC--00388) **α-sealed transfer device and portable plastic film sealers.** Fu Zhujun (Beijing Inst. of Nuclear Engineering, BJ (China)); Shan Ruixia. China Nuclear Information Centre, Beijing, BJ (China). Apr 1990. 12p. (In Chinese). (BINE--0009.). Order Number DE93602006. Source: OSTI; NTIS (US Sales Only); INIS.

An α transfer device which can be operated remotely is presented. The device is able to perform sealed transfer of radioactive articles from a hot cell or shielded glove box to the outside and non-radioactive articles from the outside to a hot cell or shielded glove box by using bag sealing technology. The structure of the transfer device is simple. Its operation is safe and reliable. The sealing performance of the device is very good (for alpha). The use of this transfer device will greatly reduce α contamination of the building and creates a favourable condition for operating radioactive materials in an undivided area. The portable heat sealing device is also a necessary tool in bag sealing technology and α-sealed transfer. Two types of portable plastic film sealers have been developed. Their structure is simple. The operation of the portable plastic film sealers is easy. Their performance is also excellent. Both the α-sealed transfer device and portable plastic film sealers are very useful to the reprocessing plant of nuclear fuel.

31350 (CNIC--00397) **A revolving irradiation stage.** Zhang Hehu (Beijing Inst. of Nuclear Engineering, BJ (China)); Wang Chuanzhen. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 5p. (In Chinese). (BINE--0010.). Order Number DE93602007. Source: OSTI; NTIS (US Sales Only); INIS.

During gamma irradiation the absorbed dose homogeneity of irradiated objects is an essential parameter, especially, the gamma irradiators are used in the scientific research field. This parameter determines the irradiation quality of irradiated objects, dose accuracy of products, utilization efficiency of source energy, processing capability, economic benefit and the technical level of the facility itself. A revolving irradiation stage which has met the requirement and improved the quality level of the scientific research has been developed. The stage revolves round the radiation sources and 12 discs used for putting irradiation objects on the stage at different radii can be rotating. Only one power supply is needed. The structure of this facility is simple and compact, and the noise is low. The operation is stable and the control is easy because it has a local and a remote control points. The use of this facility is not only improving the absorbed dose homogeneity but also obtaining the repeatability of irradiation objects. This is significant for the scientific research and pilot tests.

31351 (CONF-9205147--) **Proceedings of the tenth symposium on energy engineering sciences: Synergism of analysis, modeling, and experiment.** Argonne National Lab., IL (United States). Jul 1992. 293p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. From 10. symposium on energy engineering sciences; Argonne, IL (United States); 11-13 May 1992. Order Number DE92018777. Source: OSTI; NTIS; GPO Dep.

The Tenth Symposium on Energy Engineering Sciences was held on May 11--13, 1992, at the Argonne National Laboratory, Argonne, Illinois. These proceedings include the program, list of participants, and the papers that were presented during the seven technical sessions held at this meeting. This was the tenth annual symposium sponsored by the Engineering Research Program of the Office of Basic Energy Sciences of the US Department of Energy. The central theme of this year's meeting was synergism of analysis, modeling, and experiment and related topics. Each year a group of selected researchers in the DOE/BES Engineering Research Program are invited to present their research findings in such an open forum. This Symposium was organized into seven technical sessions: fluid mechanics (two sessions); solid mechanics; analysis, nonlinear systems (two sessions); chemical processing; and instrumentation and diagnostics. Separate abstracts were prepared for individual papers in this report.

31352 (CONF-9207102--49) **Validating criticality calculations for spent fuel with ^{252}Cf-source-driven noise measurements.** Mihalczo, J.T. (Oak Ridge National Lab., TN (United States)); Krass, A.W.; Valentine, T.E. Oak Ridge National Lab., TN (United States). [1992]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Institute of Nuclear Materials Management (INMM) annual meeting; Orlando, FL (United States); 19-22 Jul 1992. Order Number DE92019291. Source: OSTI; NTIS; INIS; GPO Dep.

The ^{252}Cf-Source-driven noise analysis method can be used for measuring the subcritical neutron multiplication factor k of arrays of spent light water reactor (LWR) fuel. This type of measurement provides a parameter that is directly related to the criticality state of arrays of LWR fuel. Measurements of this parameter can verify the criticality safety margins of spent LWR fuel configurations and thus could be a means of obtaining the information to justify burnup credit for spent LWR transportation/storage casks. The practicality of a measurement depends on the ability to install the hardware required to perform the measurement. Source chambers containing the ^{252}Cf at the required source intensity for this application have been constructed and have operated successfully for ~10 years and can be fabricated to fit into control rod guide tubes of PWR fuel elements. Fission counters especially developed for spent-fuel measurements are available that would allow measurements of a special 3 × 3 spent fuel array and a typical burnup credit rail cask with spent fuel in unborated water. Adding a moderator around these fission counters would allow measurements with the typical burnup credit rail cask with borated water and the special 3 × 3 array with borated water. The recent work of Ficaro on modifying the KENO Va code to calculate by the Monte Carlo method the time sequences of pulses at two detectors near a fissile assembly from the fission chain multiplication process, initiated by a ^{252}Cf source in the assembly allows a direct computer calculation of the noise analysis data from this measurement method.

31353 (CONF-9207102--60) **Development of robotics technology for remote characterization and remediationof buried waste.** Noakes, M.W. (Oak Ridge National Lab., TN (United States)); Richardson, B.S.; Burks, B.L.; Sandness, G.R. Oak Ridge National Lab., TN (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Institute of Nuclear Materials Management (INMM) annual meeting; Orlando, FL (United States); 19-22 Jul 1992. Order Number DE92019945. Source: OSTI; NTIS; INIS; GPO Dep.

Detection, characterization, and excavation of buried objects and materials are important steps in the restoration of subsurface disposal sites. The US Department of Energy (DOE), through its Buried Waste Robotics Program, is developing a Remote Characterization System (RCS) to address the needs of remote subsurface characterization and, in a joint program with the US Army, is developing a teleoperated excavator. Development of the RCS is based on recent DOE remote characterization testing and demonstrations performed at Oak Ridge National Laboratory and Idaho National Engineering Laboratory. The RCS, which will be developed and refined over a two- to three-year period, is designed to (1) increase safety by removing on-site personnel from hazardous areas, (2) remotely acquire real-time data from multiple sensors,

(3) increase cost-effectiveness and productivity by partial automation of the data collection process and by gathering and evaluating data from multiple sensors in real time, and (4) reduce costs for other waste-related development programs through joint development efforts and reusable standardized subsystems. For retrieval of characterized waste, the Small Emplacement Excavator, an existing US Army backhoe that is being converted to teleoperated control, will be used to demonstrate the feasibility of retrofitting commercial equipment for high-performance remote operations.

31354 (CONF-921102–9-Extd.Abst.) **Sensor-based whole-arm obstacle avoidance for unstructured environments.** Wintenberg, A.L.; Butler, P.L.; Babcock, S.M.; Ericson, M.N.; Britton, C.L. Jr.; Hamel, W.R. Oak Ridge National Lab., TN (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Joint American Nuclear Society/European Nuclear Society international meeting; Chicago, IL (United States); 15-20 Nov 1992. Order Number DE92017133. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. ROBOTS/navigation; ROBOTS; NAVIGATION; WASTE PROCESSING; MANIPULATORS; MOTION; INTEGRATED CIRCUITS; DESIGN

31355 (CONF-921102–10) **Remote excavation using the telerobotic small emplacement excavator.** Burks, B.L.; Killough, S.M.; Thompson, D.H. Oak Ridge National Lab., TN (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States). DOE Contract AC05-84OR21400. From Joint American Nuclear Society/European Nuclear Society international meeting; Chicago, IL (United States); 15-20 Nov 1992. Order Number DE92017158. Source: OSTI; NTIS; GPO Dep.

For nearly five decades the United State Department of Energy (DOE) and its predecessor agencies have engaged in broad-based research and development activities as well as in the production of nuclear weapons components. As a by-product of these activities, large quantities of waste materials have been generated. With the current emphasis on environmental restoration, DOE now plans to either to retrieve much of the legacy of buried waste or to stabilize the waste in place via in situ vitrification or by other means. Because of the potential hazards of these wastes and uncertainty about waste contents and container integrity, it is highly desirable to excavate these wastes using remotely operated equipment. This paper describes the development of a teleoperated military tractor called the Small Emplacement Excavator (SEE). 2 refs.

31356 (DPW–6512) **Visit of Wayne Hazen, Los Alamos October 15–16, 1952.** Girdler, R.M. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 30 Oct 1952. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–161). Order Number DE92019113. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This memorandum summarizes the visit of Wayne Hazen to discuss various aspects of button line and shapes fabrication operations, and inspection of the SRP installation being mocked up at the Wilmington shops. The memorandum is dated October 30, 1952.(JL)

31357 (DPW–6535) **Project 8980: Fluorophotometers for laboratory services.** Kelley, H.M. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 3 Nov 1952. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–162). Order Number DE92019114. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This report discusses the acquisition of fluorophotometers for laboratories at the Savannah River Plant.(JL)

31358 (EGG-M–92300) **An integrated optical sensor for GMAW feedback control.** Taylor, P.L.; Watkins, A.D.; Larsen, E.D.; Smartt, H.B. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 5p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9206173–7: 3. international conference on trends in welding research, Gatlinburg, TN (United States), 1-5 Jun 1992). Order Number DE92018019. Source: OSTI; NTIS; GPO Dep.

The integrated optical sensor (IOS) is a multifunction feedback control sensor for arc welding, that is computer automated and independent of significant operator interaction. It is based on three major "off-the-shelf" components: a charged coupled device (CCD) camera, a diode laser, and a processing computer. The sensor head is compact and lightweight to avoid interference with weld head mobility, hardened to survive the harsh operating environment, and free of specialized cooling and power requirements. The sensor is positioned behind the GMAW torch and measures weld pool position and width, standoff distance, and postweld centerline cooling rate. Weld pool position and width are used in a feedback loop, by the weld controller, to track the weld pool relative to the weld joint, thus allowing compensation for such phenomena as arc blow. Sensor stand off distance is used in a feedback loop to control the contact tip to base metal distance during the welding process. Cooling rate information is used to infer the final metallurgical state of the weld bead and heat affected zone, thereby providing a means of controlling post weld mechanical properties.

31359 (JAERI-M–92-058) **A research on applications of qualitative reasoning techniques in Human Acts Simulation Program.** Far, B.H. (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment). Japan Atomic Energy Research Inst., Tokyo (Japan). Apr 1992. 87p. Order Number DE93703568. Source: OSTI; NTIS; INIS.

Human Acts Simulation Program (HASP) is a ten-year research project of the Computing and Information Systems Center of JAERI. In HASP the goal is developing programs for an advanced intelligent robot to accomplish multiple instructions (for instance, related to surveillance, inspection and maintenance) in nuclear power plants. Some recent artificial intelligence techniques can contribute to this project. This report introduces some original contributions concerning application of Qualitative Reasoning (QR) techniques in HASP. The focus is on the knowledge-intensive tasks, including model-based reasoning, analytic learning, fault diagnosis and functional reasoning. The multi-level extended qualitative modeling for the Skill-Rule-Knowledge (S-R-K) based reasoning, that included the coordination and timing of events, Qualitative Sensitivity analysis (Q^SA), Subjective Qualitative Fault Diagnosis ($S_Q{}^FD$) and Qualitative Function Formation ($Q^F{}_F$) techniques are introduced. (author) 123 refs.

31360 (LA-UR–92-1916) **Ross Priory workshop presentation.** Rickel, D.G. Los Alamos National Lab., NM (United States). [1992]. 20p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9203178–1: The euromagtech workshop, Ross Priory (United Kingdom), 26-28 Mar 1992). Order Number DE92017515. Source: OSTI; NTIS; INIS; GPO Dep.

We calculated the cool down time for the outer coil of the 60 Tesla 100 ms research magnet under design at the US High Magnetic Field Laboratory. A drawing of the magnet system is shown in Fig. 1. This is a preliminary design and will undoubtedly differ from the final design. We chose convenient conductor cross sections for the solenoid and assumed a packing factor of 0.75. The 25% conductor void was assumed to be filled with insulation having the thermal properties of an epoxy glass resin mixture. Our approach was to use a 2D axisymmetric finite element calculation to accurately model a radial slice from the midplane of the solenoid. This model consisting of alternating layers of insulation and conductor is shown in Fig. 2. We compared the results from this model to those of a one material model with smeared thermal properties. The smeared properties were adjusted so that comparable thermal diffusion times were obtained by both methods. Using the smeared properties we were able to model a 2D cross section of the solenoid with all the boundaries specified while avoiding the necessity of the complex meshing of conductors and insulators. Long simulation run times were thus avoided, and we were able to quickly modify the geometry to test cooling methods.

31361 (LIU-TEK-LIC–1991-41) **On fluid power control. With special reference to multiload conditions in load sensing systems.** Linkoeping Studies in Sciences and Technology. Lantto, B. Linkoeping Univ. (Sweden). Dept. of Mechanical Engineering. 1992. 216p. Order Number DE92644280. Source: OSTI; NTIS; INIS.

Part 1. For a number of years, load-sensing systems have been increasingly used in mobile fluid power applications, where its high energy saving potential is a special advantage. A load-sensing system is a feedback system with risk of instability. The thesis at hand discusses several origins of instability as well as the problem of load interaction. It especially deals with an instability type where load interaction through the mechanical structure and the fluid power system may cause instability. Pressure-compensated control valves are also discussed. Part 2. During the last ten years, several electrohydraulic proportional seat valves have been designed. This part explores some possible uses of the advantages offered by this new type of valve. The concept studied here is an asymmetrical cylinder controlled by four proportional seat valves in a system which incorporates a variable pump. (au).

31362 (RFP–4504) **Development of location criteria for criticality alarm detector placements.** Miles, R.E. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. 1 Jul 1992. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. Order Number DE92019120. Source: OSTI; NTIS; GPO Dep.

This document describes the development of methodology used at the Rocky Flats Plant (RFP) for locating thermal neutron sensitive criticality alarm detectors. It also presents the resulting locations criteria. This work was designed to demonstrate compliance with applicable American National Standards (ANSI) and Department of Energy (DOE) order requirements for immediate detection of the minimum accident of concern. The development of the location criteria makes use of three generic models of the minimum accident of concern as defined in ANSI/American Nuclear Society (ANS) 8.3-1986. Calculations are used to compute flux values as a function of distance from these three generic models. Acceptable detector location positions are defined as those in which the calculated thermal flux equals or exceeds the measured thermal flux sensitivity of the detector. Using this methodology, conservative location criteria were developed for use in placing criticality alarm detectors in the various buildings at RFP. Proper use of these location criteria will ensure immediate detection of any credible criticality in accord with the requirements of DOE Order 5480.5 and ANSI/ANS 8.3-1986.

31363 (RFP–4608) **Thermal stress and strain analysis in traveling autogenous welds.** Roper, J.R.; Vossler, J.; Osborn, D. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. [1992]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. (CONF-9209170–1: Methods and applications of radioanalytical chemistry (MARC) users conference, Monterey, CA (United States), 5 Sep 1992). Order Number DE92019363. Source: OSTI; NTIS; GPO Dep.

This paper reports on the progress of a project to develop models for welding transient thermal stresses and strains, and post weld residual stresses and distortion. The type of welding considered is a traveling autogenous weld, with penetration by thermal conduction only. This type of welding correlates most closely with conduction mode gas tungsten arc welding or defocused electron beam or laser welding processes (without filler metal additions). The material which is modeled is type 304 stainless steel, using a mesh which simulates a small coupon of sheet material. The analyses are three dimensional. Details of application of the MARC data structure and subroutine usage in a way which is suitable for the analysis of coupled thermal-mechanical problems under boundary conditions typical of welding processes are emphasized. Special considerations involve locally intense heat input, steep temperature gradients, high temperature thermophysical and mechanical properties (including material models which account for dynamic recovery), high velocity weld pool convection, radiative and convective heat losses, and the necessity of working with large 3-dimensional meshes with many degrees of freedom. The primary problems are availability of high temperature time dependant mechanical data, numerical stability, computational time and diskspace, and verification of results. Calculated results are qualitatively consistent with generally accepted welding stresses and postweld distortion of a welded plate.

31364 (SAND–92-1773C) **Automated weapon disassembly.** Fahrenholtz, J.C. (Sandia National Labs., Albuquerque, NM (United States)); Morimoto, A.K.; Turner, C. Sandia National Labs., Albuquerque, NM (United States). 24 Jul 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9209171–1: JOWOG 39F and SUBWOG F-Robotics joint meeting, Monterey, CA (United States), 14-18 Sep 1992). Order Number DE92019294. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Sandia National Laboratories and Pantex Plant have cooperatively developed a system to robotically perform several disassembly and packaging operations in a weapon disassembly process. The weapon for which the automated system is being developed is currently being disassembled manually; the robotic system will do specific portions of the disassembly operations which have a higher radiation dose for the manual operators. Automating operations will decrease an operator's radiation exposure during processing of each weapon. This decrease could be quite important if the numbers of retirements increases or if the allowable dose limit is reduced. Since the robot will be handling both explosive and radioactive parts of the weapon, we must address nuclear explosive safety issues. If all safety and operational reviews are passed, the system is scheduled to be in use in early 1994.

31365 (SAND–92-1821C) **RATLER: Robotic All-Terrain Lunar Exploration Rover.** Purvis, J.W.; Klarer, P.R. Sandia National Labs., Albuquerque, NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9208120–1: 1992 space operations, applications and research conference, Houston, TX (United States), 5-7 Aug 1992). Order Number DE92019295. Source: OSTI; NTIS; GPO Dep.

A robotic rover vehicle designed for use in the exploration of the Lunar surface is described. The Robotic All-Terrain Lunar Exploration Rover (R.A.T.L.E.R.) is a four wheeled all-wheel-drive dual-body vehicle. A uniquely simple method of chassis articulation is employed which allows all four wheels to remain in contact with the ground, even while climbing over step-like obstacles as large as 1.3 wheel diameters. Skid steering and modular construction are used to produce a simple, rugged, highly agile mobility chassis with a reduction in the number of parts required when compared to current designs being considered for planetary exploration missions. The design configuration, mobility parameters, and performance of several existing R.A.T.L.E.R. prototypes are discussed.

31366 (UCRL-JC–110355) **Diagnostic of shock wave processes.** Urtiew, P.A. Lawrence Livermore National Lab., CA (United States). May 1992. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9205137–2: International seminar on physics and gas dynamics of shock waves, Minsk (Russian Federation), 27 May - 2 jun 1992). Order Number DE92018059. Source: OSTI; NTIS; GPO Dep.

Experimental measurements of high rate processes taking place in a shock wave dynamic environment require that the diagnostic systems have fast response and high resolution. This is not a trivial requirement considering the fact that under shock loading one can expect not only sudden changes of state across the shock discontinuity but also subsequent changes in pressure, temperature and volume due to chemical reaction, phase change and other transformations which may also take place behind the shock wave. Among the various parameters which provide direct ties to theoretical studies of the equation of state and at the same time yield to relatively accurate experimental measurements are shock velocity, particle velocity and pressure. Described here are the optical techniques VISAR and Fabry Perot interferometer for observing particle and free surface velocities in transparent media as well as in situ foil gauges for measuring pressure and particle velocity within the sample. Although these techniques are not new they have been continuously improved and upgraded at our facility to yield greater accuracy, reliability and state of the art performance. The emphasis in this paper is on the operational features of the measuring techniques, but examples of experimental results are also included.

31367 (WSRC-RP–91-1059) **Remediating biofouling of reverse osmosis membranes.** Siler, J.L. Westinghouse Savannah

River Co., Aiken, SC (United States). 22 Oct 1991. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019345. Source: OSTI; NTIS; INIS; GPO Dep.

Several potential additives and the use of influent pH adjustment were examined to remediated the biofouling problem of the ETF reverse osmosis (RO) system. Tests were conducted with simulated RO feed containing salt, metal hydroxides and bacteria. The addition of sodium hexametaphosphate (SHMP), sodium bisulfite, and adjusting the influent pH to 3 were each successful in reducing the RO biofouling. Little or no benefit was found from the use of a biofilm remover (Filmtec Alkaline Cleaner) or the use of surfactants (Surfynol or sodium lauryl sulfate). In addition, Surfynol use resulted in irreversible fouling and necessitated membrane replacement. At the water recoveries used in the ETF (>90%), sodium bisulfite addition resulted in the recovery of 70–90% of the flux and almost complete restoration of the DF to prefouled conditions. Based on the bench-scale tests completed, IWT would recommend that sodium bisulfite addition be tested at the ETF. This testing would involve optimizing the amount of bisulfite required. In addition, it is recommended that the addition of SHMP or influent pH adjustment be evaluated since the relative differences in labscale tests were small and scale-up effects could be present. The ETF operating permit allows each to be added.

31368 (Y/EN–4452) **Program overview of the hollow clay tile wall program.** Oak Ridge Y-12 Plant, TN (United States). Mar 1992. 42p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (CNPE/HCT–9). Order Number DE92019490. Source: OSTI; NTIS; GPO Dep.

Some of the facilities at the Oak Ridge Y-12 Plant were designed and constructed at a time when either the building codes did not require consideration of earthquake loads or the design requirements were considerably lower than current requirements specified by General Design Criteria, Department of Energy (DOE) Order 6430.IA. Also, some of the buildings were constructed with unreinforced infilled hollow clay tile walls (HCTWs), whose performance in past earthquakes continue to be of concern to designers and to code committees. Martin Marietta Energy Systems Inc. is in a phased program to update the safety documentation for existing facilities known as the Safety Analysis Report Update Program (SARUP). Phase I of SARUP identifies those facilities where natural phenomena (i.e. earthquake, wind/tornado and flood) loading is an initiating or contributing event to accident scenarios with potential human health effects and off-site consequences. Detailed quantitative evaluations are to be performed in Phase III to determine the effects of natural phenomena loadings on such facilities. The HCTW program was developed by the Center for Natural Phenomena Engineering to determine the contribution of HCTWs to the lateral-load-carrying capacity of steel and reinforced concrete frame buildings. The HCRW program consists of laboratory tests of unit tiles, assemblages of tiles, and HCT walls influed in steel frames; in situ tests of a full size wall and portions of walls; and analytical studies directed toward incorporating the test results into analysis methodologies for seismic structural analyses. This report gives an overview of the HC-RW program and presents an approach for applying the HCTW program results to meet DOE requirements for evaluating existing DOE facilities for natural phenomena hazards as defined in DOE 6430.IA. The program supports the Phase II SARUP evaluations for the Y-12 plant.

31369 (Y/EN–4666) **Test procedure for prism compression testing.** Oak Ridge Y-12 Plant, TN (United States). 26 May 1992. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. (HCTP–04). Order Number DE92018361. Source: OSTI; NTIS; GPO Dep.

This procedure describes the setup and procedure for testing hollow clay tile (HCT) masonry prisms. The prism test is the standard engineering test used to determine values for f'_m (specified compressive strength at 28 days) which are then used to obtain Code design allowable values. The prism compression test described herein produces load vs. deflection data which can be used to determine various properties such as the compressive strength, Modulus of Elasticity, and Poisson's ratio. The test prisms are obtained either by extraction from an existing wall or by fabrication using new materials. Prisms obtained from existing walls are fragile and tedious to extract and handle, but are very important because they provide data on the properties of existing walls. Laboratory-built prisms, used to supplement the in-situ prism test data, are easier to obtain, and allow for better control of the prism. Tests are to be made on prism specimens in two directions with respect to the cores: normal and parallel to the cores. Typically, in the Y-12 Plant buildings that have the HCT infill walls, the walls are constructed such that the cores in the HCT units run horizontally. Loading normal to the cores simulates vertical loading (gravity and vertical earthquake motions) on the walls, and loading parallel to the cores simulates the earthquake forces applied to a building wall in the horizontal direction. Prisms of single wythe 8-in. walls and the composite wythe 13-in. walls will be tested. A special Test Fixture (frame) has been designed and built to perform the in-house testing of prisms. Special handling fixtures have been designed to protect the prisms during removal from the wall site and transportation to the Test Fixture. The Test Fixture was designed for approximately a 400 kip allowable load limit.

31370 (Y/EN–4671/R2) **White paper on the Hollow Clay Tile Wall Program.** Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States). Center for Natural Phenomena Engineering. Mar 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (CNPE/HCT–14/R2). Order Number DE92019491. Source: OSTI; NTIS; GPO Dep.

Some of the facilities at the Oak Ridge Y-12 Plant were designed and constructed at a time when either the building codes did not require consideration of earthquake loads or the design requirements were considerably lower than current requirements specified by General Design Criteria, Department of Energy (DOE) Order 6430.1A. Also, some of these buildings were constructed with unreinforced hollow clay tile walls (HCTWs), whose performance in past earthquakes continue to be of concern to designers and to code committees. Martin Marietta Energy Systems Inc. is conducting a phased program to update the safety documentation for exiting facilities. Phase I of the Safety Analysis Report Update Program (SARUP) identifies those facilities where natural phenomena (i.e. earthquake, wind/tornado and flood) loading is an initiating or contributing event to accident scenarios with potential human health effects. Detailed quantitative evaluations are performed in Phase II for the effects of natural phenomena loadings. The HCIW program was developed to determine the contribution of HCTWs to the lateral-load-carrying capacity of steel and reinforced concrete frame buildings. The HC-IV program consists of laboratory tests of unit tiles, assemblages of tiles, and HCT walls enfilled in steel frames; in situ tests of a full size wall and portions of walls; and analytical studies directed toward incorporating the test results into analysis methodologies for seismic structural analyses. This report examines the underlying basis of the HCTW program. Also, an approach is presented for applying the HCTW program results to meet DOE requirements for evaluating existing DOE facilities for natural phenomena hazards as defined in DOE 6430.1A. The program supports the Phase II SARUP evaluations for the Y-12 Plant.

4204 Heat Transfer and Fluid Flow

Refer also to citation(s) 30931, 30932, 30933, 31095, 31129, 31160, 31612, 31677, 31697, 31698, 32538, 32539

31371 (AAA-REP–88-3) **Numerical fluid flow and heat transfer calculations on multiprocessor systems.** Oehman, G.A.; Malen, T.E.; Kuusela, P. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1989. 42p. Order Number DE92562970. Source: OSTI; NTIS.

The first part of the report presents the basic principles of parallel processing, and factors influencing the efficiency of practical applications are discussed. In a multiprocessor computer, different parts of the program code are executed in parallel, i.e. simultaneous with respect to time, on different processors, and thus it becomes possible to decrease the overall computation time by a factor, which in the ideal case is equal to the number of processors. The application study starts from the numerical solution of the twodimesional Laplace equation, which describes the steady heat conduction in a solid plate and advances through the solution of the three dimensional Laplace equation to the case of study laminar fluid flow in a twodimensional box at Reynolds numbers up to 20. Hereby the stream function-vorticity method is first applied and the SIMPLER method. The conventional (sequential) numerical algoritms for these fluid flow and heat transfer problems are found not to be ideally suited for conversion to parallel computation, but sped-up ratios considerably above 50 % of the theoretical maximum are regularly achieved in the runs. The numerical procedures we coded in the OCCAM-2 language and the test runs were performed at who Akademi on the imperimental HATHI-computers containing 16 T4l4 and 100 INMOS T800 transputers respectively.

31372 (AAA-REP–88-4) **Estimation of air flow profile based on state measurements.** Saxen, H.; Sillanpaeae, M. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1989. 25p. Order Number DE92562971. Source: OSTI; NTIS.

This report considers a method for evaluating the internal main flow profile of humid air inside an enclosure, the air temperature and moisture content profiles of which are known in advance. Further, any material and energy exchange with the environment is considered to be given. Thus far, only stationary phenomena in two spatial coordinates have been studied. The procedure proposed is based on a minimization of the joint effect of local mass and energy residuals for a set of control volumes. This analysis gives the 'most probable' air flow profile. Different ways both to describe the flows across the boundary of a control volume and to mathematically formulate the minimization problem are discussed. Attention is given to a linear objective function minimized by means of linear programming. The method is also extended to dealing with unknown source terms. At the end of the report, some examples that illustrate the procedure may be found.

31373 (AAA-REP–89-1) **A comparison of numerical procedures for calculation of steady two- and three-dimensional two-phase flow.** Kallio, S. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1989. 83p. Order Number DE92562972. Source: OSTI; NTIS.

A general purpose computer program has been written for simulation of steady one- and two-phase flow in two and three dimensious in a cartesian coordinate system. The main objective is to use the program for calculation of gas-solids flow although the present version of tire code has been used so far only for testing different algorithms, relaxation methods etc. for some cases with relatively simple boundary conditions. A eulerian two-fluid model and simplified descriptions for two-phase flow phenomena have been utilized.

31374 (AAA-REP–89-5) **Experiences with numerical fluid flow and heat transfer calculations on multiprocessor computers: Lecture given at the Symposium on Chemical Engineering of the Finnish Chemical Congress in Helsinki, on November 9, 1989.** Oehman, G.A. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1989. 10p. Order Number DE92562976. Source: OSTI; NTIS.

Parallel processing requires a decomposition of the numerical task into a number of smaller subtasks which can be simultaneously computed on the individual processors. In easy cases the computer itself may be able to detect and utilize parallel features automatically from a sequential program code, whereas in other applications suitable parallel subtasks may be created only by a thorough restructuring of the computational problem or not at all. Numerical fluid flow and heat/mass transfer simulations, which comsume large amounts of computer time, are not well-conditioned with respect to parallelization. Because in a flowing fluid there is a continuous physical interaction between all parts of the fluid, it is not possible to compute the state of one subdomain of the flow field independently of the others. Thus the geometrical decomposition of a flow field is applicable only in combination with a repeated interchange of intermediate results between the processors. This communication should be minimized because it tends to decrease the overall efficiency of the computation. Experiences with the parallelization of an iterative explicit procedure for steady 3-D viscous two-phase flow at Reynolds numbers up to 100 will be described. The solid phase is described by the Eulerian approach and two-way interaction with the gas phase is included. The parallel solution of 3-D singlephase natural convection flows was also investigated. Programs were written i Parallel Fortran and test runs with two-dimensional decomposition of the field were performed at Aabo Akademi on the HATHI-2 computer.

31375 (AAA-REP–90-4) **Parallel computation of steady three-dimensional two-phase flows.** Oehman, G.A. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1990. 49p. Order Number DE92562975. Source: OSTI; NTIS.

A method is described for the iterative solution of three-dimensional (3-D) fluid flow and problems related to that on a reconfiqurable parallel computer with distributed memory. The method is based on the principle of geometrical decomposition of the field in subdomains and it has a large degree of universality. The iterative procedure to be parallelized is assumed to consist of a sequence of sweeps, during which the points of the discretized field are passed in a fixed order and field functions recalculated according to explicit alqebraic formulas. In the investigated cases the 3-D flow field was decomposed in two directions, and thus the 2-D array of subdomains corresponded to a 2-D network of processors. The method is applied to the steady recirculating flow of two phases through a 3-D Cartesian flow chamber. The two-phase flow is described accordinq to the Eulerian approach. The particle viscosity, the particle diffusivity and the eddy viscosity of the fluid are assumed to be constants, and a two-way force interaction between the phases is considered. The governing equaticns are made dimensionless and are discretized to algebraic approximations. The iterative procedure may be characterized as an explicit modificaticn of the SIMPLER algorithm. Programs were written in parallel and test runs were performed on the HATHI-2 computer at Aabo Akademi. The largest Reynolds number was 100 and the maximum decomposition of the field considered 56 subdomains distributed to an equal number of processors of the T800 transputer type. Complete numerical conformity with the results of a corresponding sequential program was achieved, but the speed-up unsatisfactory work is required to improve it.

31376 (AAA-REP–91-5) **A simulation model for time-dependent drying, devolatilization and combustion of a single solid fuel particle.** Oehman, G.A.; Karlsson, T.B.; Koskinen, H. Abo Akademi, Turku (Finland). Heat Engineering Lab. 1991. 42p. Order Number DE92562979. Source: OSTI; NTIS.

A simulation model is developed for the drying devolatilization and combustion of a single spherical fuel particle which is surrounded by a hot bulk gas flow of constant temperature and composition. The simulation describes how the size, the temperature and the composition of the particle change as functions of time beginning from the initial state, i.e. when the particle is cold, and ending when the particle is completely burned out. As the temperature is increasing the drying and the devolatilization of different substances in the particle take face under heat absorption. The released water vapor and other volatile gases are assumed to flow through fine pores to the surface of the particle The combustion is assumed to be controlled by diffusion, and the flame front may be situated either at the surface of the shrinking carbon core of the particle or at some distance from it. The temperature and composition changes within the core of the particle are numerically treated as true time-dependent whereas the heat and mass transfer processes in the gaseous boundary layer and in a possible product layer of ash are treated as psendo-stationary at each moment of time.

31377 (CNIC–00406) **Using probability density distribution analysis of bubble diameter and spatial frequency analysis to identify flow pattern of two-phase flow in an unvisual pipe.** Tong Yunxian (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Liu Ming. China Nuclear Information Centre, Beijing, BJ (China). Jun 1990. 13p. (In Chinese). (TSHUNE–0013.). Order Number DE93601995. Source: OSTI; NTIS (US Sales Only); INIS.

Time-domain waveform of a signal and its analytical technique is a classical method to identify the flow in an unvisual pipe. However this method easily makes a confusion in flow regime identification owing to the influence of gas speed. The flow regime of two-phase flow is straightly and physically characterized by the size of gas bubbles relating to pipe diameter and the distribution of gas bubbles. The space-domain analysis method consists of the spatial waveform of signals, the probability density distribution function of relative diameter of gas bubbles (relative to the pipe diameter) and the spatial frequency spectrum. To identifiy flow regime by this method is directly based on the physical concept of flow regime-the flow space structure. The experimental results of typical bubbles and slug flow are given, which were obtained by using impedance probe as a sensor and space-domain analysis technique. The advantages of space-domain analysis technique for identifying flow regime in physical conception are straightforwardness and simplicity.

31378 (CNIC–00416) **An experimental investigation on turbulent flow through symmetric wall-subchannels of rod bundles.** Wu Shaorong (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Rehme, K. China Nuclear Information Centre, Beijing, BJ (China). Jul 1990. 18p. (In Chinese). (TSHUNE–0014.). Order Number DE93601996. Source: OSTI; NTIS (US Sales Only); INIS.

Measurements of the flow velocity distribution, the wall shear stresses and the turbulent Reynolds stress were performed in the wall-subchannels of two rod bundles. The rod bundle with four parallel rods was arranged symmetrically in a rectangular channel. The pitch-to-diameter ratio was P/D = 1.148. The wall-to-diameter ratios $W_1/D = 1.045$ and $W_2/D = 1.074$ respectively. The Reynolds numbers in these two experiments were 6.11×10^4 and 7.07×10^4. The experimental results show that the structure of turbulence in rod bundles differs greatly from the structure in circular tubes. Especially, in the narrow gaps formed by rods and channel walls, the turbulence intensities are increased in both axial and azimuthal directions. The kinetic energy of turbulence is also increased in these area. This result is caused by the strong turbulent fluctuations through the gaps.

31379 (CNIC–00482) **Experimental research on flow resistance in piping components under natural circulation condition.** Cheng Liangcheng (Southwest Inst. of Nuclear Reactor Engineering, Sichuan, SC (China)); Wang Wenkang. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 10p. (In Chinese). (SINRE–0026.). Order Number DE93601997. Source: OSTI; NTIS (US Sales Only); INIS.

The resistance characteristics of piping components such as turbine, bundle test section, valves and heat exchanger under natural circulation condition are presented. Two sets of piping elements connected in series are also tested. One includes two horizontal elbows with angle of 90 deg and 180 deg respectively and a straight tube of 2.5 meter long. The other includes two vertical elbows with angle of 90 deg, a horizontal elbow with angle of 90 deg C and a straight tube of 2.5 meter long. The experimental data obtained under natural circulation condition are compared with those obtained under forced circulation condition. The results show the loss characteristics of the above piping components, except for heat exchanger, are consistent both in natural circulation condition and in forced circulation condition. The tests are conducted over the following ranges of the parameters: pressure $p = 10 \approx 15$MPa; Reynolds number $Re = 10^3 \approx 1.4 \times 10^5$; mass velocity $G = 72.4 \approx 313$kg/($m^2 \cdot s$). The results can be used for safety design of reactors.

31380 (CNIC–00487) **Investigation on subcold boiling-induced hydrodynamic instability in a natural circulation system.** Wu Shaorong (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Jiang Shengyao; Wu Xinxin; Zhou Lei; Tong Yunxian; Han Bing; Zhang Youjie. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 11p. (In Chinese). (TSHUNE–0015.). Order Number DE93601998. Source: OSTI; NTIS (US Sales Only); INIS.

The investigations were performed on the Thermohydraulic Experimental system HRTL-5 which is a full-scale and full-parameter simulator to the primary loop of the low-temperature heating reactor at Institute of Nuclear Energy Technology, Tsinghua University. The method of visual observation under pressurized operation conditions combined with data recording and analyzing was adopted. The features of hydrodynamic stability of the natural circulation system were investigated with varying system pressure, varying inlet subcooling and in a wide range including single-phase flow, subcold boiling flow and low quality bulk boiling flow at the exit of the test section. Some new hydrodynamic instability phenomena induced by subcold boiling in a natural circulation system with low pressure were discovered in this investigation. Several different mode of mass flow oscillation was observed. Under certain conditions, static mass flow drift occured in the natural circulation system. The results of the investigation are of great importance for thermal-hydraulic design, safety analysis and start procedure design of a pressurized natural circulation system with low pressure, such as pool-type low temperature heating reactor and integrated vessel-type low temperature heating reactor.

31381 (CNIC–00489) **An experimental study of bubble detachment point in subcooled boiling at low pressure and velocity.** Li Rizhu (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Tong Yunxian; Tang Bo. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 7p. (In Chinese). (TSHUNE–0016.). Order Number DE93601999. Source: OSTI; NTIS (US Sales Only); INIS.

The purpose of this experiment was to determine the thermohydraulic parameters in pool-type nuclear heating reactor with natural circulation. The test section was composed of transparent vertical annuluses.The shape and size of electric heating rods were similar to nuclear fuel rods. The bubble detachment point of subcooled boiling was identified by visual method.

31382 (CONF-9110369–, pp. 136-165) **The pendulum model for wake size prediction for a gas bubble in liquid-solid suspensions.** Tsuchiya, Katsumi (Ohio State Univ., Columbus (United States)); Liangshih Fan. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

A mechanistic model, denoted as the pendulum model, which interrelates the frequency of vortex shedding and the size of the bubble wake is developed based on secondary motion of a single gas bubble rising in liquids and/or liquid-solid suspensions. In the model, the bubble and its primary wake are regarded as a single semi-rigid body steadily rocking at the vortex shedding frequency. Inherent model parameters, including bubble geometric parameters, the bubble rise velocity and the vortex shedding frequency, are expressed in terms of the bubble size to permit a priori prediction of the wake size. The predicted wake sizes are compared satisfactorily with the experimental data reported in the literature over a wide range of the bubble Reynolds number.

31383 (CONF-9110369–, pp. 166-181) **Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows.** Binder, J.L. (Univ. of Illinois, Urbana (United States)); Hanratty, T.J. USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. DOE Contract FG02-86ER13556. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Lagrangian methods are used to examine the distribution of particles in a two-dimensional turbulent horizontal flow. The concentration field is viewed as resulting from a distribution of line sources of particles. The influence of gravity on the behavior of the particles from one of these sources is assumed, on average, to act independently from the turbulence. Two cases are considered: gas-liquid annular flow in a two-dimensional channel and sediment transport.

31384 (CONF-9110369–, pp. 310-315) **A review of numerical computations on the mechanics of deformable particles using boundary integral methods.** Pozrikidis, C. (Univ. of California, San Diego, La Jolla (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United

States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

The author has performed a series of numerical studies of several complementary problems addressing the behavior of single drops whose interface is characterized by constant surface tension. He considered, in particular, the stability, transient motion, and steady configuration of liquid drops under several conditions including: (a) the gravitational settling of a drop in an infinite ambient fluid; (b) the gravitational motion of a drop towards or away from a plane wall; (c) the gravitational settling of train of drops through a vertical cylindrical tube; and (d) the deformation of a drop in a simple shearing flow. Furthermore, he studied the behavior of a cell which is enclosed by an incompressible-elastic membrane, modeling a red blood cell. Currently, he is considering the behavior of a suspension of two-dimensional drops with constant surface tension between two plane walls in relative motion, and the flow of a periodic array of three-dimensional drops in a shearing flow. Results of a preliminary computation are illustrated in a figure.

31385 (CONF-9110369–, pp. 368-387) **Concentrated colloidal dispersions: Statistical mechanics.** Russel, W.B. (Princeton Univ., NJ (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States); National Science Foundation, Washington, DC (United States). [1991]. From 3. Joint Department of Energy/National Science Foundation (DOE/NSF) workshop on flow of particulates and fluids; Worcester, MA (United States); 22-24 Oct 1991. In *Joint DOE/NSF workshop on flow of particulates and fluids. Proceedings.* 396p. Order Number DE92012692. Source: OSTI; NTIS.

Colloidal dispersions consist of small particles, generally 5 nm to 10 μm, dispersed in a liquid, perhaps water or an organic solvent. Brownian motion is just observable for the largest particles but drives rapid fluctuations at the lower end of the range. Even at the nanometer level, though, the viscous solvent strongly damps thermal motion; one normally detects the resulting random displacements rather than the velocities characteristic of the kinetic energy. The objective here is to demonstrate that combining the classical Smoluchoski formulation, integrated to the pair level, with recently derived closures for the three-body couplings provides a framework completely analogous to integral equation theories for equilibrium structure and properties. Thus a basis now exists for (a) comparing approximate treatments in the literature and (b) constructing more accurate theories in the future.

31386 (CONF-921110–15) **Evaporation of nonazeotropic mixture of refrigerants R143a and R124 flowing inside smooth and corrugated tubes.** Hinton, D.L. (Tennessee State Univ., Nashville, TN (United States)); Conklin, J.C.; Vineyard, E.A. Oak Ridge National Lab., TN (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Winter annual meeting of the American Society of Mechanical Engineers; Anaheim, CA (United States); 8-13 Nov 1992. Order Number DE92018994. Source: OSTI; NTIS; GPO Dep.

Because heat exchanger thermal performance has a direct influence on the overall cycle performance of vapor-compression refrigeration machinery, enhanced heat transfer surfaces are of interest to improve the efficiency of heat pumps and air conditioners. We investigated a nonazeotropic refrigerant mixture (NARM) of 75% R143a and 25% R124 (by mass) to study its thermal performance in an evaporator made of conventional smooth tubes and another evaporator made of corrugated, or spirally indented, tubes. We investigated the evaporating heat transfer and pressure drop characteristics in an experimental test loop model of a domestic heat pump system employing a variable speed compressor. The refrigerant circulates inside the central tube and the water circulates in the annulus. At a refrigerant mass flux of approximately 328 kg/m^{2}s, the measured irreversible pressure drop of the corrugated surface was 100% higher than that of the smooth surface, and the measured heat transfer coefficient was 11% higher than that of the smooth surface.

31387 (DOE/ER/14147–2) **Interfacial area and two-phase flow structure development measured by a double-sensor probe.** Leung, Waihung; Revankar, S.T.; Ishii, Yoshihiko; Ishii, Mamoru. Purdue Univ., Lafayette, IN (United States). School of Nuclear Engineering. Jun 1992. 126p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER14147. (PU-NE–92/1). Order Number DE92019459. Source: OSTI; NTIS; GPO Dep.

In this report, we studied the local phasic characters of dispersed flow regime both at the entrance and at the fully developed regions. Since the dispersed phase is distributed randomly in the medium and enclosed in relatively small interfaces, the phasic measurement becomes difficult to obtain. Local probe must be made with a miniaturized sensor in order to reduce the interface distortion. The double-sensor resistivity probe has been widely used in local void fraction and interface velocity measurements because the are small in comparison with the interfaces. It has been tested and proved to be an accurate local phasic measurement tool. In these experiments, a double-sensor probe was employed to measure the local void fraction and interface velocity in an air-water system. The test section was flow regime can be determined by visualization. Furthermore, local phasic measurements can be verified by photographic studies. We concentrated our study on the bubbly flow regime only. The local measurements were conducted at two axial locations, L/D = 8 and 60, in which the first measurement represents the entrance region where the flow develops, and the second measurement represents the fully developed flow region where the radial profile does not change as the flow moves along the axial direction. Four liquid flow rates were chosen in combination with four different gas injection rates. The superficial liquid velocities were j_l = 1.0, 0.6,0.4, and 0.1 m/s and superficial gas velocities were j_g = 0.0965, 0.0696, 0.0384, and 0.0192 m/s. These combinations put the two-phase flow well in the bubbly flow regime. In this sequence of phenomenological studies, the local void fraction, interface area concentration, sauter mean diameter, bubble velocity and bubble frequency were measured.

31388 (EGG-M–91505) **Natural convection between a vertical cylinder and a surrounding array.** McEligot, D.M.; O'Brien, J.E.; Stoots, C.M.; Larson, T.K.; Christenson, W.A.; Mecham, D.C.; Lussie, W.G. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-920903–16: International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants, Salt Lake City, UT (United States), 20-24 Sep 1992). Order Number DE92019763. Source: OSTI; NTIS; INIS; GPO Dep.

The generic situation considered is natural convection between a single heated, vertical cylinder and a surrounding array of cooler vertical cylinders in a triangular pattern. The ratio of the test section temperature to the cooling tube temperature was varied up to 2.6 by adjusting the electrical power. The Rayleigh number, based on test section diameter and air properties evaluated at cooling tube temperature, ranged from 2.9 x 10^4 to 4.6 x 10^5. Results indicate that the convective heat transfer data could be approximated as $Nu_D\ (T_{ts}/T_{ct})^{0.14} = 0.156\ Ra_D{}^{1/3}$ in the apparent turbulent region for $Ra_L > 1.2 \times 10^{11}$.

31389 (EGG-M–92200) **Turbulent natural convection between a perforated vertical cylinder and a surrounding array.** McEligot, D.M.; Stoots, C.M.; Christenson, W.A.; O'Brien, J.E.; Mecham, D.C.; Lussie, W.G. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-921110–24: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019766. Source: OSTI; NTIS; INIS; GPO Dep.

A number of situations can be hypothesized to occur in an advanced or special purpose nuclear reactor such that the core is filled with a gas but there is no forced flow to remove the thermal energy evolved. Experiments were conducted by resistively hearing a vertical circular cylinder of length-to-diameter ratio of about 160 centered inside a concentric perforated tube which was, in turn, surrounded by three larger diameter tubes cooled internally with water flow. The ratio of the test section temperature to the cooling tube temperature was varied up to 2.6; and the Rayleigh number, based on tube diameter and properties evaluated at the cooling tube temperature, ranged from 2.9×10^4 to 9.2×10^5. Results indicate that the convective heat transfer parameters for the perforated tube are about fifteen per cent higher than for the smooth bare tube centered in the same position relative to the array. The Nusselt number for convective heat transfer across the annulus between the heated test section and the perforated tube corresponded to parallel laminar flow.

31390 (EGG-M–92378) **Particle-fluid two-phase flow modeling.** Mortensen, G.A. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Trapp, J.A. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9207115–1: Japan-US seminar on two-phase flow dynamics, San Francisco, CA (United States), 6-10 Jul 1992). Order Number DE92017847. Source: OSTI; NTIS; GPO Dep.

This paper describes a numerical scheme and computer program, DISCON, for the calculation of two-phase flows that does not require the use of flow regime maps. This model is intermediate between-thermal instantaneous and the averaged two-fluid model. It solves the Eulerian continuity, momentum, and energy equations for each liquid control volume, and the Lagrangian mass, momentum, energy, and position equations for each bubble. The bubbles are modeled individually using a large representative number of bubbles thus avoiding the numerical diffusion associated with Eulerian models. DISCON has been used to calculate the bubbling of air through a column of water and the subcooled boiling of water in a flow channel. The results of these calculations are presented.

31391 (FEI–2103) **Boiling crisis in water forced flow in tubes.** Ivashkevich, A.A. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1990. 17p. (In Russian). Order Number DE92644271. Source: OSTI; NTIS (US Sales Only); INIS.

The simple model of nucleate boiling crisis in water forced flow in long uniformly heated tubes is proposed. The model explains the regularities of the crisis of the first and the second orders. The correlations for the first critical heat flux density and for the boundary void fraction are obtained. The verification and the optimization of these correlations are fulfilled. 16 refs.; 3 figs.; 2 tabs.

31392 (FEI–2110) **Modelling of freon heat transfer in water under supercritical pressure.** Gorban', L.M.; Pomet'ko, R.S.; Khryashchev, O.A. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1990. 19p. (In Russian). Order Number DE92644272. Source: OSTI; NTIS (US Sales Only); INIS.

Experimental investigations of forced convection heat transfer to freon-12 at subcritical P_{Fr}=1.06 MPa and supercritical P_{Fr}=4.46 MPa pressures are discussed. Experimental results are compared with correlations like Miheev. Some empirical correlations for region of investigation are proposed. Based on above-mentioned results, the possibility of development scaling laws for forced convection heat transfer from freon-12 to water under supercritical pressure is shown. Numerical calculations showed, that application of freon-12 results to a relatively low powers and temperature differences, while the roo-mean-square error of scaling Δt is approximately 12%. 5 refs.; 11 figs.

31393 (FEI–2139) **Boundary void fraction in water flow in tubes.** Ivashkevich, A.A. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1990. 16p. (In Russian). Order Number DE92644273. Source: OSTI; NTIS (US Sales Only); INIS.

The examination of the eight before proposed correlations for the prediction of the boundary void fraction at the forced water flow in the pipes was carried out. A simple boiling crisis model of the thermal equilibrium steam-water stream in the long uniformly heated pipes is proposed. The correlation for the boundary void fraction at the forced water flow has been obtained. 15 refs.; 1 fig.; 3 tabs.

31394 (JAERI–1326) **Two-phase flow characteristics analysis code: MINCS.** Watanabe, Tadashi (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment); Hirano, Masashi; Akimoto, Masayuki; Tanabe, Fumiya; Kohsaka, Atsuo. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 246p. Order Number DE93703564. Source: OSTI; NTIS; INIS.

Two-phase flow characteristics analysis code: MINCS (Modularized and INtegrated Code System) has been developed to provide a computational tool for analyzing two-phase flow phenomena in one-dimensional ducts. In MINCS, nine types of two-phase flow models-from a basic two-fluid nonequilibrium (2V2T) model to a simple homogeneous equilibrium (1V1T) model-can be used under the same numerical solution method. The numerical technique is based on the implicit finite difference method to enhance the numerical stability. The code structure is highly modularized, so that new constitutive relations and correlations can be easily implemented into the code and hence evaluated. A flow pattern can be fixed regardless of flow conditions, and state equations or steam tables can be selected. It is, therefore, easy to calculate physical or numerical benchmark problems. (author).

31395 (KFK–4760) **The three-dimensional transient two-phase flow computer programme BACCHUS-3D/TP.** Bottoni, M.; Dorr, B.; Homann, C. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Reaktorsicherheit. Apr 1992. 457p. Order Number DE93702480. Source: OSTI; NTIS (US Sales Only); INIS.

The three-dimensional single-phase flow version of the BACCHUS code, which describes the thermal behaviour of a coolant in hexagonal bundle geometry, developed earlier, provided the basis for the development of the two-phase flow version documented in this report. A detailed description is given of the two-phase Slip Model (SM), and of the Homogeneous Equilibrium Model (HEM) as a subcase, which presents several improvements from both viewpoints of physical modelling and numerical treatment, with respect to usual models found in the literature. The most advanced Separated Phases Model (SPM) is then described in all analytical details necessary to fully understand its implementation in the code. Poblems related to the link between the two above models into an integrated code version are then discussed. The code provides an additional option for modelling of active or passive, permeable or impermeable blockages. This option is documented separately. New numerical methods for solving the algebraic systems of equations derived from the linearization of the fundamental equations have completely superseded previous ones and are explained in detail. Eventually a section is dedicated to an overview of the code verification, made over several years, which goes from steady state single-phase unheated bundle experiments up to fast transient two-phase flow experiments in electrically heated 37-pin bundles. (orig.).

31396 (LUTMDN-TMVS–1002) **Theoretical and experimental studies of frost between two plates.** Andersson, Ingrid. Lund Inst. of Tech. (Sweden). Div. of Thermodynamics, Fluid Mechanics and Heat Transfer. Mar 1992. 284p. (In Swedish). Order Number DE92563097. Source: OSTI; NTIS.

Frost has a complex structure and frost formation is influenced by several parameters, according to a literature study. A basic understanding of the frost formation process would be valuable in many situations, e.g. when optimizing equipment. A mathematical model for frost growth in a humid air stream between two plates, where one is cold, has been developed, based on mass balance, heat balance, and diffusion of water vapor in the frost. At the calculations, the space between the two plates is divided into a number of equally long elements. For each element, the balance equations and the equation for the diffusion of water vapor in the frost are formed. A new description is introduced by using a variable which denotes the part of the mass flux that is increasing the frost thickness. A computer program was developed, that with the use of experimental values from the literature, calculates the frost thickness, the frost density, the temperature of the frost surface, the mass flux to the frost layer, and the mass transfer coefficient. The results show good agreement between the values obtained from the model and the values obtained in experiments. An experimental facility has been built to investigate the frost growth between two cold plates, under conditions similar to those in an air to air heat exchanger. The frost thickness, the frost mass, the change in relative humidity with corresponding temperatures, the change in the temperature of the humid air and temperatures between the plates, can be measured. From these values, e.g. the heat flux, the mass flux, the heat transfer coefficient, the mass transfer coefficient, and the effective thermal conductivity of the frost can be calculated. The results of the experiments show how the frost formation depends on different parameters like time, the temperature of the cold surfaces, the inlet humidity, and the inlet air velocity.

31397 (LUTMDN-TMVS–1002 I:1-30) **Frost formation - A literature study.** Andersson, Ingrid. Lund Inst. of Tech. (Sweden). Div. of Thermodynamics, Fluid Mechanics and Heat Transfer. Mar 1992. (In Swedish). In *Theoretical and experimental studies of frost between two plates.* 111p. Order Number DE92563097. Source: OSTI; NTIS.

A literature study of frost formation from moist air in natural or forced convection. Geometries are plates or cylinders. The phenomenon is complex, depending on several parameters. Most articles represent experimental work, but a number of studies deal with theoretical calculations, often with qualitative conclusions. 29 refs., 21 figs.

31398 (LUTMDN-TMVS–1002 II:1-91) **Frost growth in convection between two plates with one cold side.** Andersson, Ingrid. Lund Inst. of Tech. (Sweden). Div. of Thermodynamics, Fluid Mechanics and Heat Transfer. Mar 1992. (In Swedish). In *Theoretical and experimental studies of frost between two plates.* 111p. Order Number DE92563097. Source: OSTI; NTIS.

Mathematical descriptions are given of air flow between two plates, of which the lower one is of a temperature below the freezing point. The model is built on mass balance and heat balance and uses a diffusion equation. The effective thermal conductivity is represented by a weighting of two polynoms from literature. A parameter is used for describing how great a part of the mass flux is consumed in increasing the frost thickness and density, respectively. Good agreement is found between theoretical and experimental data for frost density, thickness, temperature and mass transfer. 13 refs., 25 figs.

31399 (LUTMDN-TMVS–1002 IV:1-111) **Experimental evaluation of different parameters importance for the frosting process between plates.** Andersson, Ingrid. Lund Inst. of Tech. (Sweden). Div. of Thermodynamics, Fluid Mechanics and Heat Transfer. Mar 1992. (In Swedish). In *Theoretical and experimental studies of frost between two plates.* 111p. Order Number DE92563097. Source: OSTI; NTIS.

Laboratory experiments were performed to study the frost growth under conditions similar to those in an air-to-air heat exchanger. The thickness and weight of the frost, changes of the air moisture and temperature are recorded. From these data heat and mass flux, and heat and mass transfer coefficients are deducted. 24 refs., 73 figs.

31400 (NAL-TR–1121T) **Effects of cooling-air injection on secondary flows and losses in a turbine cascade.** Yamamoto, a. (National Aerospace Laboratory, Tokyo (Japan)); Kondo, Y.; Murao, R. National Aerospace Lab., Chofu, Tokyo (Japan). Sep 1991. 18p. Order Number DE92562499. Source: OSTI; NTIS.

In this paper, to investigate the overall performance and internal flows of air-cooled turbine blade rows, internal flows in a linear cascade model are examined using secondary air injections originating from various points located along of the turbine surfaces. Consequently, it was found that this secondary air flow interacted with the cascade passage vortices and significantly changed the loss distribution. In addition, it was illustrated that the cascade overall energy loss decreased when the air was injected along the mainstream flow. On the other hand, it was also shown that the energy loss increased when the air was injected against the mainstream flow from several points on the blade leading edge. Furthermore, the effects of cooling-air injection on the overall kinetic energy of the secondary flows and on the cascade outlet angle are discussed. In this discussion, only one loss coefficient is defined and used. 9 refs., 20 figs.

31401 (SAND–92-1795C) **Simulation of liquid drop breakup behavior in a flow field using discrete element techniques.** Harper, F.T. (Sandia National Labs., Albuquerque, NM (United States)); Gorham, E.D.; El-Genk, M.S. Sandia National Labs., Albuquerque, NM (United States). [1992]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920903–11: International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants, Salt Lake City, UT (United States), 20-24 Sep 1992). Order Number DE92019435. Source: OSTI; NTIS; INIS; GPO Dep.

In this study, a discrete element technique was used to simulate drop breakup in two dimensions. A series of simulations in which the drop breakup occurred in the presence of a flow field was performed. The density ratio of the flow field to the drop in the simulations was comparable to many of the isothermal liquid/liquid drop breakup experiments performed to investigate hydrodynamic breakup during Fuel Coolant Interactions (FCIs). The randomly directed internal kinetic energy of the drop increased rapidly at the beginning of the interaction between the drop and the flow field due to momentum transfer from the flow field to the drop. After the initial increase in internal energy of the drop, the momentum transferred from the flow field to the drop in the form of translational kinetic energy of the center of mass of the drop. It was also observed that the drops simulated in the presence of a flow field required higher internal kinetic energies to fragment than did the drops observed in the simulations performed in the absence of a flow field.

31402 (UCRL-LR–110322) **Heat transfer in a liquid metal crucible with an integral blackbody cavity.** Havstad, M.A. Lawrence Livermore National Lab., CA (United States). 15 May 1992. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019640. Source: OSTI; NTIS; GPO Dep.

Calculations of the heat transfer in a liquid metal crucible with an integral blackbody cavity have been made using two- and three-dimensional finite element techniques. Computations of thermal gradients and radiant heat exchange out of the cavity are combined to estimate cavity apparent emissivity (or quality) in a total hemispherical sense. We adjusted the model to estimate quality in a normal total sense, and then we used the Planck function to estimate normal spectral quality over the wavelength range 0.4 to 10 μm. Because of the small cavity size, its proximity to the crucible's heat source, and the conductivity of the crucible material, the estimated cavity quality is high, >98% . The crucible design analyzed here was employed in an apparatus for the measurement of the normal spectral emissivity and optical constants of liquid uranium and aluminum. We found the results to be conservative.

4205 Materials Testing

Refer also to citation(s) 30948, 31262, 31634, 31636, 32016

31403 (INIS-mf–13350) **4th international school of nondestructive testing.** Kovacik, M.; Luston, M. (eds.). Slovenska Vedeckotechnicka Spolocnost, Bratislava (Czechoslovakia). Dom Techniky. 1991 75p. (In Czech, Slovak). (CONF-9104387–: 4. international school of nondestructive testing, Vysoke Tatry (Czechoslovakia), 22-25 Apr 1991). Order Number DE93602036. Source: OSTI; NTIS (US Sales Only); INIS.

The proceedings contain 25 contributions, out of which 3 have been inputted in INIS. They deal with the verification of results of ultrasonic inspection of austenitic overlays of nuclear power plant components, with ultrasonic detection of cracks perpendicular to the surface of welds of nuclear reactor pressure vessels, and with new trends in leak testing of hermetic compartments in nuclear power plants. (M.D.). 1 tab.

31404 (IS–5081) **Review of progress in quantitative NDE: Abstracts.** Ames Lab., IA (United States). [1992]. 255p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States); National Inst. of Standards and Technology, Gaithersburg, MD (United States); American Society for Nondestructive Testing, Miami, FL (United States) DOE Contract W-7405-ENG-82. (CONF-920799–Absts.: Review of progress in quantitative non destructive evaluation (NDE), La Jolla, CA (United States), 19-24 Jul 1992). Order Number DE92018814. Source: OSTI; NTIS; GPO Dep.

Abstracts of 386 papers and plenary presentations are included. The plenary sessions related to the national technology initiative. The other sessions covered the following NDE topics: corrosion, electromagnetic arrays, elastic wave scattering and backscattering/noise, civil structures, material properties, holography, shearography, UT wave propagation, eddy currents, coatings, signal processing, radiography, computed tomography, EM imaging, adhesive bonds, NMR, laser ultrasonics, composites, thermal, magnetic measurements, nonlinear acoustics, interface modeling and characterization, UT transducers, new techniques, joined materials, probes and systems, fatigue cracks and fracture, imaging and sizing, NDE in engineering and process control, acoustics of cracks, and sensors. An author index is included. (DLC)

31405 (KCP–613-4679) **Development of a 1000 g, 10 ms mechanical shock test capability: Final report.** Thorne, L.F. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019193. Source: OSTI; NTIS; GPO Dep.

A test capability has been developed to subject manufactured products to a mechanical shock pulse of 1000 g (gravitational units), 10 milliseconds. A dual carriage impact device was used with a horizontal pneumatic actuator and an 80 foot track system to perform the shock pulse by impact test techniques. A spread sheet was assembled to predict various mechanical shock test parameters using thermoplastic as the shock spring. The dual carriage device was modified so that a thermoplastic column 4.375 inches in diameter and 97 inches long could be used to produce a haversine shaped shock pulse. This new test capability has been used to shock 80 pound test packages within the tolerances of the 1000 g, 10 ms requirement.

31406 (LA-UR–92-2464) **Characterizing laser fusion welded aluminum using synchrotron x-ray microtomography.** Milewski, J.O. (Los Alamos National Lab., NM (United States)); Hmelo, A.B.; D'Amico, K.L.; Dunsmuir, J.H.; Ferguson, S.R. Los Alamos National Lab., NM (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36 ;AC02-76CH00016. (CONF-921183–1: 8. international conference on TMS beam processing of advanced materials, Chicago, IL (United States), 5 Nov 1992). Order Number DE92018608. Source: OSTI; NTIS; GPO Dep.

Preliminary research into the application of high power Nd-YAG lasers for welding indicate a dependency of the occurrence of weld discontinuities on processing parameters such as pulse duty cycle, travel speed, etc. The size and distribution of of weld features have been characterized using synchrotron microtomography, using facilities at the National Synchrotron Light Source. The ability of this technique to image defects such as gross and minor porosity, and centerline cracking, enables a metrology of interior surfaces which cannot be provided by metallurgical sectioning techniques alone.

31407 (NAL-TR–1117) **Structural analysis of thermal fatigue failures on rocket combustion chambers by the finite element method.** Hashimoto, T. (National Aerospace Laboratory, Tokyo (Japan)). National Aerospace Lab., Chofu, Tokyo (Japan). Jul 1991. 21p. Order Number DE92562500. Source: OSTI; NTIS.

Considerations were given on rocket combustion chambers for damage causes and internal deformation behavior, with inelastic analyses using the finite element method, and discussions were made on improving their durability. combustion chamber can cause its inner wall center to develop a deformation of swelling toward the cooling grooves because of expansion of the inner wall during heating. In a cooling cycle removed of thermal load, the inner wall deforms swelling toward the combustion chamber side. Effects from these deformations cause stress to concentrate on the bottom of the cooling groove fins. Repetition of the cycle develops low-cycle fatigue, resulting in fatigue cracks after several repetitions. The life time until an occurrence of low-cycle fatigue cracks assumed from the result of analyzing the distortion range agreed well with the result of inference after a fracture, using a scanning electron microscope (SEM). In addition, the result of deformation analysis by modelling the cracks showed a good agreement with the characteristics of the inner wall deformation after the fracture. It was verified that the life time before a crack generation can be extended largely by changing the cooling groove shape. Also, it was indicated that this method is effective in analyzing thermal stress and thermal deformation of rocket combustion chambers. 11 refs., 25 figs., 1 tab.

4210 Combustion Systems

Refer also to citation(s) 30530, 30540, 30541, 30808, 30809, 31344, 31407, 32522

31408 (NEI-DK–915) **Circulating fluidized bed with optimal control of process parameters to achieve better environmental conditions and flexibility in operation.** Holm, E.L.; Wendelbo, P.; Linding Lauridsen, T.; Widell, K.E.; Olsen, A. Aalborg Boilers A/S, Aalborg (Denmark). [1992]. 116p. Contract EN3F-0064-DK(b);Contract EM-1323/86-6. Order Number DE92562863. Source: OSTI; NTIS.

EFP-86.

A strong international energy development is currently taking place, towards new electric-power-producing technologies based on coal-fired combined cycle, gas and steam turbine plants. The new technologies are characterized by high fuel utilization and low environmental impact. This report is the result of a development project based on a Pressurized Circulating Fluidized Bed which is one of the most promising new coal technologies. The object of the project was to establish the design basis of an advanced fluidized bed based on the patented multi-circulating boiler design of Aalborg Boilers, Denmark. In addition to establishing the general design and construction principles, the project has concentrated on acquiring the knowledge necessary to build an environmentally low-impact plant. Based on tests on a 2 MWt circulating fluidized bed test plant, an empirically based model has been developed for the calculation of SO_x- and NO_x-emissions. The project includes a wide theoretical study of a number of plant configurations based on different turbomachinery. Software has been developed for the analysis of a plant under both stationary and dynamic conditions, such as start-up, control and shut down. An effective flue gas cleaning at high temperature and pressure is of paramount importance for this technology. Based on theoretical studies as well as tests performed at the University of Aalborg, a gas cleaning principle has been chosen based on a pre-separator and two subsequent cyclone stages. (AB).

4220 Mining and Underground Engineering

Refer also to citation(s) 31555

4230 Marine Engineering

31409 (NEI-NO–247) **The interaction between water waves and marine structures.** Palm, E. Oslo Univ. (Norway). Matematisk Inst. 1992 31p. Order Number DE92562988. Source: OSTI; NTIS.

The study of waves and wave-body interaction has become very important in recent years due to the increase in offshore activities related to oil extraction under the sea floor. Earlier the main interest in this field was focused on ship and ship motion. Now also the study of the forces acting on oil platforms, risers, pipe-lines etc., and their motions, has become important. At the same time there has been a renewed interest in ships, especially in high-speed ships. Ships are characterized by their slender form, i.e. the length is much larger than the maximum lateral dimension of the body. Oil platforms may be of rather different type. Some are penetrating the sea floor, namely the jacket type and the gravity platform. Platforms fixed to the bottom have been built for water depths up to about 300 m. The semi-submersible, and also the floating production ship, are moored, but are floating relatively freely. The tension leg platform (TLP), which is a modern concept among platforms, is connected to the bottom by vertical tethers, but is still able to perform horizontal oscillations and small vertical oscillations. The incident waves will be diffracted by the body and the change in momentum transport will create a force on the body. The waves will also set up viscous forces. These may be form drag forces due to vortex shedding or friction forces. 23 refs., 10 figs.

31410 (NUI-R–5-90) **Thermal balance and operational aspects of 3 hour lock-outs at 37 bar during a simulated dive.** Knudsen, G. (and others); Hope, A.; Padbury, E.H. Norges Skipsforskningsinstitutt, Trondheim (Norway). Feb 1990. 53p. Order Number DE92562985. Source: OSTI; NTIS.

The report deals with deep water diving tests for offshore operations. Considering the depth of some of the newest oil and gas fields, divers may have to perform work at about 400 msw within a few years. Procedures and equipment to ensure safe diving at that depth have to be developed and verified in chamber dives before being used offshore. In the present study, 3 divers participated in a simulated wet dive to a depth equivalent to 360 msw at GKSS,FRG. The breathing gas was Trinix (5% N_2) and standard deep diving equipment was used. The subjects performed rest and work routines (Tests A and B respectively), within inspired gas temperature at the divers lowest comfortable level while the skin temperature was thermally neutral and even a bit warmer. A work routine with warm gas temperature and skin temperature at the subjects lower comfort level was also performed (Test C). Despite the low (16°C) inspired gas temperature at this depth no reductions of the rectal temperature were observed (Test A and B). However, hot water and mean skin temperature were kept high so only minor heat losses were observed in Tests A and B. Thus thermal balance between heat produced and heat lost was achieved during the trials. The cold inspired gas caused an increased mucus production and breathing difficulties. Local effects on ECG (nerve conduction in myocard) were also observed. The results indicate that some of the recommended limits for inspired gas temperatures are too liberal. 30 refs., 11 figs., 4 tabs.

4260 Components, Electron Devices and Circuits

Refer also to citation(s) 30773, 30927, 30928, 30929, 30930, 31132, 31144, 31150, 31253, 31510, 31529, 31621, 31622, 31629, 31633, 31636, 31639, 32064, 32476, 32511

31411 (CNIC--00448) **Theoretical study of aluminium-copper impedance matching targets for laser-high-pressure state equation.** Lai Dongxian (Institute of Applied Physics and Computational Mathematics, Beijing, BJ (China)); Luo Pingqing; Zhang Yonghui; Yu Ren; Xie Hanming; Liu Leiming. China Nuclear Information Centre, Beijing, BJ (China). Oct 1990. 12p. (In Chinese). (IAPCM--0017.). Order Number DE93602312. Source: OSTI; NTIS (US Sales Only); INIS.

The propagation of laser-driven shock wave in the combined target with gold-layer, the shielding effects of gold-layer on the superthermal electrons and the function of gold-layer to the stability of shock wave are introduced. The designing method of target bases for Al-Cu impedance matching is also given. Targets with and without inserted gold-layer were constructed and tested at Senguang laser facility in 1989. After analyzing the tested data, it is confirmed that the 0.8 TPa high pressure was produced at the Cu sample and the measuring accuracy of shock wave velocity was better than 5%. The Al-Cu impedance matching test was fully success. These results are close to the experimental fitting curves (including the data of underground nuclear explosions) published by Nellis in 1988.

31412 (JINR-R--10-90-131) **VKP-6 programmed time-to-digital converter with additional functions.** Novozhilov, V.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1990. 11p. (In Russian). Order Number DE92644545. Source: OSTI; NTIS (US Sales Only); INIS.

The VKP-6 CAMAC programmed time-to-digital converter with additional functions is described. The number of time channels is up to 4096, channel width may vary from 0.5 μs to 32 ms. The registration regimes are +1 and +N, where N is the number of events. A program for the time-to-digital converter is written into the internal memory of the device which stores 4K of 12-bit words. Besides the device may operate as a programmable generator of series of rectangular pulses (total number of pulses is up to 2048), a device for filtering in time gates (number of gates is up to 2048), a time from 1 μs to 2^{46} μs, ratemeter with control of low and high levels of intensity. 5 refs.; 3 figs.; 1 tab.

31413 (LA-UR--92-1901) **Development of XUV projection lithography at 60–80 nm.** Newnam, B.E.; Viswanathan, V.K. Los Alamos National Lab., NM (United States). [1992]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9203177--1: Society Photography Institute of Engineers (SPIE) microlithography '92, San Jose, CA (United States), 8-13 Mar 1992). Order Number DE92017517. Source: OSTI; NTIS; GPO Dep.

The rationale, design, component properties, and properties, and potential capabilities of extreme-ultraviolet (XUV) projection lithography systems using 60–80 nm illumination and single-surface reflectors are described. These systems are evaluated for potential application to high-volume production of future generations of gigabit chips.

31414 (MLM--3755) **Nickel plating of flexible products: Statistical optimization.** Snow, S.L.; Bruns, R.J.; Tomasoski, R.J. Mound, Miamisburg, OH (United States). 12 Aug 1992. 49p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-88DP43495. Order Number DE92040815. Source: OSTI; NTIS; GPO Dep.

A statistical study was conducted on a Mound-designed nickel/gold co-plater to determine its optimal operating parameters. Operating parameters were varied to discover their effect on the plated flexible circuit's shininess, porosity, and uniformity of thickness. In addition to determining the parameters that would give the best quality plating, the study also resulted in an increase in plating rate.

31415 **Shielded helix traveling wave cathode ray tube deflection structure.** Norris, N.J.; Hudson, C.L. To Dept. of Energy. 22 Jan 1991. USA Patent patent application 7-643,304. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-88NV10617 ;AC08-83NV10282. Order Number DE92019828. Source: OSTI; NTIS; GPO Dep.

This invention relates to deflection structures for cathode ray tubes. It is an object of this invention to provide an improved helical coil deflection structure for a cathode ray tube wherein each turn in the coil is separated from adjacent turns by conductive shielding means which surrounds at least three sides of each turn of the helical coil. (GHH)

31416 (SAND--92-0660C) **An analog macromodel of the SG1525A PWM for use with SPICE2G.6 simulators.** Raney, C.W. Sandia National Labs., Albuquerque, NM (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9208119--2: 35. Midwest symposium on circuits and systems, Washington, DC (United States), 12 Aug 1992). Order Number DE92019423. Source: OSTI; NTIS; GPO Dep.

An analog macromodel for the SG1525A PWM (pulse width modulator) that is compatible with SPICE2G.6 and PSPICE analog simulators has been developed. It exhibits no convergence problems, simulates realistic line and load responses, frequency response, output voltage levels, and has time domain capability. Model development and a comparison of macromodel performance with actual measurements will be discussed.

31417 (SAND--92-0661C) **Temperature tracking SPICE macro-model for laser and LED driven opto-coupler assemblies.** Deveney, M.F. Sandia National Labs., Albuquerque, NM (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9208119--1: 35. Midwest symposium on circuits and systems, Washington, DC (United States), 12 Aug 1992). Order Number DE92019296. Source: OSTI; NTIS; GPO Dep.

SPICE 2G.6 compatible models were required for two opto-coupler assemblies in order to perform simulations to assess the design margins of the circuits in which they are used. Both of these assemblies are made up of discrete components, with one employing a laser diode as the light source, while the second uses a LED. Although, in use, these assemblies couple digital-like pulse trains, they are analog devices capable of operating over wider ranges of voltage than digital devices. Robust models which accurately simulate over these voltage ranges were desired. Also for ease of use, models that would track the operation of each of the assemblies over the entire specified temperature range were preferred. In addition to simulating the assembles in their intended mode of operation, it was necessary to reproduce an unwanted noise signal transfer that was observed in an early prototype circuit.

31418 (SAND-92-0669C) **A temperature tracking SPICE2G.6 macromodel of the 6N134 optocoupler.** Helms, C. (Sandia National Labs., Albuquerque, NM (United States)); Perry, G. Sandia National Labs., Albuquerque, NM (United States). [1992]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9208119–3: 35. Midwest symposium on circuits and systems, Washington, DC (United States), 12 Aug 1992). Order Number DE92040093. Source: OSTI; NTIS; GPO Dep.

The popular circuit simulator platform SPICE2G.6 was chosen for the development of an advanced macromodel for the 6N134 optocoupler. The subcircuit model presented in this paper properly simulates DC and transient characteristics over the temperature range −55 to 125°C using a single parameter set and the .TEMP statement available within SPICE. The model's limitations and predictive accuracy relative to measured data are described.

31419 (SAND–92-0971C) **Latent image exposure monitor using scatterometry.** Milner, L.M. (New Mexico Univ., Albuquerque, NM (United States). Center for High Technology Materials); Hickman, K.C.; Gaspar, S.M.; Bishop, K.P.; Naqvi, S.S.; McNeil, J.R.; Blain, M.; Draper, B.L. Sandia National Labs., Albuquerque, NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9203177–2: Society Photography Institute of Engineers (SPIE) microlithography '92, San Jose, CA (United States), 8-13 Mar 1992). Order Number DE92019427. Source: OSTI; NTIS; GPO Dep.

We discuss the use of light scattered from a latent image to control photoresist exposure dose and focus conditions which results in improved control of the critical dimension (CD) of the developed photoresist. A laser at a non-exposing wavelength is used to illuminate a latent image grating. The light diffracted from the grating is directly related to the exposure dose and focus and thus to the resultant CD in the developed resist. Modeling has been done using rigorous coupled wave analysis to predict the diffraction from a latent image as a function of the substrate optical properties and the photoactive compound (PAC) concentration distribution inside the photoresist. It is possible to use the model to solve the inverse problem: given the diffraction, to predict the parameters of the latent image and hence the developed pattern. This latent image monitor can be implemented in a stepper to monitor exposure in situ, or prior to development to predict the developed CD of a wafer for early detection of bad devices. Experimentation has been conducted using various photoresists and substrates with excellent agreement between theoretical and experimental results. The technique has been used to characterize a test pattern with a focused spot as small as 36μm in diameter. Using diffracted light from a simulated closed-loop control of exposure dose, CD control was improved by as much as 4 times for substrates with variations in underlying film thickness, compared to using fixed exposure time. The latent image monitor has also been applied to wafers with rough metal substrates and focus optimization.

31420 (UCRL-JC–107973) **Numerical modelling of the suppression of stimulated Brillouin scattering due to finite laser bandwidth.** Dixit, S.N. Lawrence Livermore National Lab., CA (United States). Apr 1992. 14p. Sponsored by USDOE, Washington, DC (United States); North Atlantic Treaty Organization, Brussels (Belgium). DOE Contract W-7405-ENG-48. Grant 0375/88. (CONF-920124–27: Society of Photo-Optical Instrumentation Engineers' international symposium on laser spectroscopy as part of SPIE's symposium on optics, electro-optics and laser applications in science and engineering, Los Angeles, CA (United States), 1 Order Number DE92018064. Source: OSTI; NTIS; GPO Dep.

We present numerical simulations of transverse stimulated Brillouin scattering (SBS) in large aperture optical elements and investigate its suppression due to finite laser bandwidth. A specific model for the laser bandwidth, namely, a sinusoidal phase modulation of the electric field, is considered. Our calculations indicate that bandwidths larger than the SBS linewidth lead to significant reduction in the SBS gain. We also investigate the dependence of the SBS gain on the modulation frequency and find that for a fixed overall bandwidth, a modulation frequency of the order of the SBS linewidth leads to an optimal reduction of the SBS gain.

31421 (UCRL-JC–108748) **Prediction of electromagnetic pulse generation by picosecond avalanches in high-pressure air.** Mayhall, D.J.; Yee, J.H. Lawrence Livermore National Lab., CA (United States). May 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920515–32: 9. international conference on high power particle beams, Washington, DC (United States), 25-29 May 1992). Order Number DE92019382. Source: OSTI; NTIS; GPO Dep.

The gas avalanche switch is a laser-activated, high-voltage switch, consisting of a set of pulse charged electrodes in a high-pressure gas. Induced electrons from a picosecond-scale laser pulse initiate an avalanche discharge between high-voltage and grounded electrodes. If the voltage, pressure, and dimensions are correct, the rapid avalanche, fueled by the immense number of electrons available in the gas, collapses the applied voltage in picoseconds and generates electromagnetic pulses with widths as short as 1–10 ps and 3 dB bandwidths of 20–120 GHz. With proper voltage or pressure detuning, wider pulses and lower bandwidths occur. A number of versions of the switch are possible. The simplest is a parallel plate capacitor, consisting of a gas between two parallel plate conductors. High voltage is applied across the two plates. A parallel plate, Blumlein geometry features a center electrode between two grounded parallel plates. This geometry emits a single pulse in each direction along the parallel plates. A frozen wave geometry with multiple, oppositely charged center electrodes will emit AC pulses. Series switches consisting of gas gaps between two electrodes are also possible. A recent investigation with 6 an overvolted series gap reported voltage switching times as short as 50 ps. For investigation of these switches, we have developed a two-dimensional, electromagnetic, finite difference, electron fluid computer code for ionization in high-pressure gases. This code simultaneously, self-consistently, and implicitly solves Maxwell's curl equations for transverse magnetic modes between perfectly conducting parallel plates. It solves electron fluid conservation equations for density, momentum, and energy. The coordinates are presently rectangular. Multiple charged, rectangular, perfect conductors may be situated between the plates.

31422 (UCRL-JC–109843) **Self-consistent one-dimensional modelling of x-ray laser plasmas.** Wan, A.S.; Walling, R.S.; Scott, H.A.; Mayle, R.W.; Osterheld, A.L. Lawrence Livermore National Lab., CA (United States). 23 Jun 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920523–4: 3. international colloquium on x-ray lasers, Schliersee (Germany), 18-22 May 1992). Order Number DE92019543. Source: OSTI; NTIS; INIS; GPO Dep.

This paper presents the simulation of a planar, one-dimensional expanding Ge x-ray laser plasma using a new code which combines hydrodynamics, laser absorption, and detailed level population calculations within the same simulation. Previously, these simulations were performed in separate steps. We will present the effect of line transfer on gains and excited level populations and compare the line transfer result with simulations using escape probabilities. We will also discuss the impact of different atomic models on the accuracy of our simulation.

31423 (UCRL-JC–109844) **Experiments on resonantly photo-pumped x-ray lasers.** Nilsen, J.; Porter, J.L.; Da Silva, L.B.; MacGowan, B.; Beiersdorfer, P..; Elliott, S.R.; Young, B.K. Lawrence Livermore National Lab., CA (United States). 23 Jun 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920523–3: 3. international colloquium on x-ray lasers, Schliersee (Germany), 18-22 May 1992). Order Number DE92019542. Source: OSTI; NTIS; INIS; GPO Dep.

We describe our recent effort to identify and study a promising resonantly photopumped x-ray laser scheme. In particular we will describe a scheme which uses the strong emission lines of a nickel-like ion to resonantly photo-pump a neon-like ion and enhance the lasing of the neon-like 3p → 3s transitions.

31424 (UCRL-JC–109845) **Demonstration of a neon-like rubidium x-ray laser.** Nilsen, J.; Porter, J.L.; Da Silva, L.B.; MacGowan, B.J. Lawrence Livermore National Lab., CA (United States). 23 Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920523–5:

3. international colloquium on x-ray lasers, Schliersee (Germany), 18-22 May 1992). Order Number DE92019576. Source: OSTI; NTIS; GPO Dep.

We demonstrate a rubidium ion laser with two strong laser lines at 173 and 176 Å. The lasing transitions are $3p \rightarrow 3s$ transitions in neon-like rubidium. Several weaker lasing transitions are also observed. Wavelengths of the five lasing transitions are reported. Gains of 1.9 and 1.4 cm $^{-1}$ are measured for the two strongest lines. The weaker gain than other neon-like laser systems is ascribed to poor target quality coupled with the dilution associated with using RbCl.

31425 (UCRL-JC–110043) **Table-top x-ray lasing based on optical-field-induced ionization.** Eder, D.C.; Amendt, P.; Bolton, P.R.; Guethlein, G.; London, R.A.; Rosen, M.D.; Wilks, S.C. Lawrence Livermore National Lab., CA (United States). 2 Jul 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920523–2: 3. international colloquium on x-ray lasers, Schliersee (Germany), 18-22 May 1992). Order Number DE92019374. Source: OSTI; NTIS; INIS; GPO Dep.

Table-top x-ray laser schemes in H- and Li-like ions following optical-field-induced ionization are discussed. The use of ultrashort ($\leq$100 fsec) ionizing pulses is shown to be necessary to keep secondary heating mechanisms, e.g., stimulated Raman scattering, at acceptable levels. The combination of longitudinal pumping and ultrashort pulses gives modest energy requirements ($E_{in} \leq 0.1$ J for Li-like Ne). The effects of plasma dispersion and longitudinal pumping, on the relative speeds of the ionizing laser pulse and the x- ray photons, are included in our calculations. The x-ray laser scheme is calculated to have relatively high energy efficiencies ($E_{out}/E_{in} \geq$ 10–5) in Li-like Ne at 98 Å. Two approaches for creating the initial high-density gas/plasma using a laser heated thin film and a high-density gas jet are described. Applications in material science and chemistry, e.g., photoelectron spectroscopy, requiring the high-repetition rate (10–100 Hz) of the proposed x-ray laser are discussed.

31426 (UCRL-JC–110209) **Experimental studies of x-ray laser spectral profiles: Observation of gain narrowing and saturation behavior.** Koch, J.A. (Lawrence Livermore National Lab., CA (United States)); MacGowan, B.J.; Da Silva, L.B.; Matthews, D.L.; Mrowka, S.; Underwood, J.H.; Batson, P.J. Lawrence Livermore National Lab., CA (United States). 17 Jul 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48 ;AC03-76SF00098. (CONF-9206255–1: 11. international conference on spectra line shapes, Carry Le Rouet (France), 8-12 Jun 1992). Order Number DE92019603. Source: OSTI; NTIS; INIS; GPO Dep.

We discuss our recent measurements of the spectral width of the 206.38Å x-ray laser transition in Ne-like Se. These measurements used a high-resolution grating spectrometer and were performed over a wide range of laser amplifier lengths. The data have enabled us to extrapolate the intrinsic line width and to observe the effects of gain-narrowing and saturation on the line profile. We find an intrinsic width which is 1.4 times the Doppler width, we observe gain-narrowing in intermediate length amplifiers, and we observe no re-broadening in long, saturated amplifiers. These results suggest that collisional line-broadening has a significant effect on the line profile and saturation behavior of this laser. We discuss modeling we have performed in order to simulate the experimental data, and we discuss future experimental and theoretical efforts we believe are necessary in order to understand line broadening and line transfer issues in x-ray laser plasmas.

43 PARTICLE ACCELERATORS

Refer also to citation(s) 32492

4301 Design, Development, and Operation

Refer also to citation(s) 32162

31427 (BNL–47142) **RHIC status.** Ozaki, S. Brookhaven National Lab., Upton, NY (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706–21: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019367. Source: OSTI; NTIS; INIS; GPO Dep.

The RHIC project is in its second year of construction at Brookhaven National Laboratory (BNL) with funding in place since 1991 and DOE approval for construction in January 1992. Key personnel for all of the collider systems are on board, the project management organization as well as procedures are in place, engineering design and prototype tests are in progress, and procurement of major accelerator components has begun.

31428 (BNL–47784) **The Brookhaven National Laboratory Accelerator Test Facility.** Batchelor, K. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706–17: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019247. Source: OSTI; NTIS; INIS; GPO Dep.

The Brookhaven National Laboratory Accelerator Test Facility comprises a 50 MeV traveling wave electron linear accelerator utilizing a high gradient, photo-excited, raidofrequency electron gun as an injector and an experimental area for study of new acceleration methods or advanced radiation sources using free electron lasers. Early operation of the linear accelerator system including calculated and measured beam parameters are presented together with the experimental program for accelerator physics and free electron laser studies.

31429 (BNL–47785) **The BNL Accelerator Test Facility and experimental program.** Ben-Zvi, I. (Brookhaven National Lab., Upton, NY (United States)). Brookhaven National Lab., Upton, NY (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9206193–5: Advanced accelerator concepts workshop, Port Jefferson, NY (United States), 14-20 Jun 1992). Order Number DE92019259. Source: OSTI; NTIS; INIS; GPO Dep.

The Accelerator Test Facility (ATF) at BNL is a users' facility for experiments in Accelerator and Beam Physics. The ATF provides high brightness electron beams and high-power laser pulses synchronized to the electron beam, suitable for studies of new methods of high-gradient acceleration and state-of-the-art Free-Electron Lasers. The electrons are produced by a laser photocathode rf gun and accelerated to 50 MeV by two traveling wave accelerator sections. The lasers include a 10 mJ, 10 ps ND:YAG laser and a 500 mJ, 10 to 100 ps CO_2 laser. A number of users from National Laboratories, universities and industry take part in experiments at the ATF. The experimental program includes various laser acceleration schemes, Free-Electron Laser experiments and a program on the development of high-brightness electron beams. The ATF's experimental program commenced in early 1991 at an energy of about 4 MeV. The full program, with 50 MeV and the high-power laser will begin operation this year.

31430 (CONF-9203164–2) **North American radioactive beam initiatives.** Garrett, J.D. Oak Ridge National Lab., TN (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From International workshop on the physics and techniques of secondary nuclear beams; Dourdan (France); 23-25 Mar 1992. Order Number DE92019185. Source: OSTI; NTIS; INIS; GPO Dep.

After a brief review of existing radioactive beam facilities in North America, two new initiative (the Oak Ridge Radioactive Ion Beam Facility and the IsoSpin Laboratory) are described in some detail. An evaluation of which nuclei these facilities will be able to study, that cannot be studied with stable targets and beams, also is presented.

31431 (GANIL-A–91-02) **A new radiation safety control system for Ganil.** Saint Jores, P. De; Luong, T.T.; Martina, L.; Vega, G. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 6p. (CONF-9111203–: International conference CUM workshop on current trends in data acquisition and control of accelerators, Calcutta (India), 19-21 Nov 1991). Order Number DE92570067. Source: OSTI; NTIS (US Sales Only); INIS.

A second generation radiation safety control system has been installed to upgrade the initial system which was not flexible enough to support new ion beams and new experimental conditions required by the accelerator operation. The main reasons which necessitated the improvement of the safety control system are presented. The new system which controls the Ganil accelerator from the first quarter of 1990 is described. It uses a star structured architecture, VME standard processors and front-end modules activated by pDOS operating system and high level language (C and Fortran) tasks, associated with enhanced resolution color displays for real time synoptics. (R.P.) 4 refs., 4 figs.

31432 (GANIL-A--91-03) **Recent improvements and new possibilities of the Ganil facility.** Bajard, M. Ganil group. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 4p. (CONF-910505--: 1991 Institute of Electrical and Electronics Engineers (IEEE) particle accelerator conference (PAC), San Francisco, CA (United States), 6-11 May 1991). Order Number DE92570068. Source: OSTI; NTIS (US Sales Only); INIS.

The results of the machine improvements recently achieved, including ECR source, new injector, and medium energy output are presented. The measured characteristics of all the recently accelerated beams are summarized, featuring results obtained with metallic ions: ^{40}Ca, ^{48}Ca, ^{58}Ni, ^{64}Zn, ^{157}Gd, ^{238}U. Specific beams can be tuned: very short bunch length, parallel beam for channeling experiments, special beam line focusing for secondary particles. Finally, new developments like axial injection at 100 kV, high intensity secondary beam production and new operational facilities are described. (author) 8 refs., 2 figs., 2 tabs.

31433 (IPNO-DRE--91/11) **AGOR: A superconducting cyclotron for light and heavy ions plans for experimental facilities and physics program.** Gales, S. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 24p. (CONF-910396--: 1. European biennial workshop on nuclear physics, Megeve (France), 25-29 Mar 1991). Order Number DE92570106. Source: OSTI; NTIS (US Sales Only); INIS.

The construction of the K600 superconducting cyclotron AGOR, a joint undertaking of the KVI Groningen and the Institut de Physique Nucleaire at Orsay, has reached the stage where the assembly of major subsystems is underway. Field measurements are scheduled to start in the fall of this year, beam tests should start at Orsay by the end of 1992 before AGOR final installation at Groningen. The beam guiding system, the location and equipments of the main experimental areas are currently being designed. Taking advantage of the broad range of ions and energies that AGOR will made available (from 200 MeV protons to 100 MeV/A α down to 6 MeV/A Pb ions), the first ideas about the physics research to be done will be presented. (author) 28 refs., 15 figs., 2 tabs.

31434 (JINR-R--9-91-61) **On-line system for selection and measurement of currents in magnetic elements of beam lines at the JINR phasotron.** Belyaev, A.L. (and others); Kazakova, G.G.; Kiyan, I.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 6p. (In Russian). Order Number DE92644285. Source: OSTI; NTIS (US Sales Only); INIS.

An automated system for selection and measurents of currents in magnetic elements of beam lines at the JINR phasotron is described. The system controls over 50 power supply units with currents up to 1100 A. The programs are written in Turbo Pascal, version 5.5. A set of hierarchical menus is used for a dialoque between the operator and the system. The system allows automatic tuning of the beam line and automatic tuning control in long-term operation. The system showed sufficient reliability and is used at the phasotron. 4 refs.; 3 figs.

31435 (JINR-R--9-91-82) **Convertion project of the AS UzSSR cyclotron.** Alenitskij, Yu.G. (AN Uzbekskoj SSR, Tashkent (Uzbekistan). Inst. Yadernoj Fiziki); Glazov, A.A.; Zaplatin, E.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 6p. (In Russian). Order Number DE93602009. Source: OSTI; NTIS (US Sales Only); INIS.

The existing classical cyclotron U-150 was suggested to be converted into the isochronic cyclotron U-200T with four spiral structure of the magnetic field aimed to accelerate protons, deuterons, ^{3}He, ^{4}He in the energy ranges 20-70 MeV, 10-35 MeV, 30-90 MeV, 20-70 MeV, respectively. Calculated parameters of the magnetic, high frequency and extracting systems of the accelerator are represented. 8 refs.; 6 figs.; 1 tab.

31436 (JINR-R--9-91-84) **Accelerating system simulation of U-200T isochronous cyclotron.** Glazov, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems); Zaplatin, E.N.; Kochkin, V.A.; Umerov, R.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 7p. (In Russian). Order Number DE93602010. Source: OSTI; NTIS (US Sales Only); INIS.

A project accelerating system of the isochronous cyclotron U-200T is a plane resonance line with panel frequency change. Experimental investigations of this structure was conducted on the 1:5 scale model at subsequent complication of its geometry. A full testing calculation of the resonance frequency and system tuning range as conducted at each stage of simulation. A comparative accuracy analysis of different analytical formulae for computations of wave impedance of the plane resonance line in relation to the experimental data was conducted. The investigations allowed the geometric dimensions and RF parameters of the accelerating system to be finally defined. 10 refs.; 10 figs.

31437 (JINR-R--9-91-324) **Radio-frequency linear ion accelerator (proposal for development of the acceleration for ion beam implantation).** Borovkov, D.P. (and others); Vadeev, V.P.; Govorov, A.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 6p. (In Russian). Order Number DE92644284. Source: OSTI; NTIS (US Sales Only); INIS.

Radio-frequency linear accelerator for ion implantation is presented. All ions with $q/A>0.02$ can be accelerated in the range 1.0 MeV to $4>0$ MeV with less than 2% energy spread in this accelerator. 15 refs.; 2 figs.; 1 tab.

31438 (LAL-RT--92-04) **Electronics around the accelerators-mathematical recalls.** Le Meur, G. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Feb 1992. 46p. (In French). Order Number DE93701156. Source: OSTI; NTIS (US Sales Only); INIS.

The author presents the main mathematical tools used in electronics and in particular in accelerator electronics: complex functions, distributions, Fourier series, Laplace transformation, Fourier transformation and probabilities.

31439 **Tandem betatron.** Keinigs, R.K. To Dept. of Energy. 1991. USA Patent patent application 7-643,315. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019826. Source: OSTI; NTIS; GPO Dep.

Two betatrons are provided in tandem for alternately accelerating an electron beam to avoid the single flux swing limitation of conventional betatrons and to accelerate the electron beam to high energies. The electron beam is accelerated in a first betatron during a period of increasing magnetic flux. The electron beam is extracted from the first betatron as a peak magnetic flux is reached and then injected into a second betatron at a time of minimum magnetic flux in the second betatron. The cycle may be repeated until the desired electron beam energy is obtained. In one embodiment, the second betatron is axially offset from the first betatron to provide for electron beam injection directly at the axial location of the beam orbit in the second betatron.

31440 (SLAC-PUB--5844) **Review of studies on conventional linear colliders in the S- and X-Band regime.** Loew, G.A. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-920706--22: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019648. Source: OSTI; NTIS; INIS; GPO Dep.

This paper gives a status report on the conventional approaches to linear colliders at DESY, KEK, SLAC and INP-Protvino in the S- and X-Band regime. Critical topics are reviewed and a discussion of global issues such as future R&D requirements is included.

31441 (SLAC-PUB-5864) **Review of SLC performance.** Phinney, N. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-920706-27: 15. international conference on high energy accelerators; 26. international conference on high energy physics; 16. international LINAC conference, Hamburg (Germany); Dallas, TX (United States); Ottawa (Canada), 20-24 Jul 1992; 6-12 aug 1 Order Number DE92040944. Source: OSTI; NTIS; INIS; GPO Dep.

The SLAC Linear Collider (SLC) has begun a new era of operation with the SLD detector. During 1991 there was a first engineering run for the SLD in parallel with machine improvements to increase luminosity and reliability. For the 1992 run, a polarized electron source was added and more than 10,000 Zs with an average of 23% polarization have been logged by the SLD. This paper will discuss the performance of the SLC in 1991 and 1992 and the technical advances that have produced higher luminosity. Emphasis will be placed on issues relevant to future linear colliders such as producing and maintaining high-current, low-emittance beams and focusing the beams to the micron scale for collisions.

31442 (SLAC-PUB-5875) **Designing reliability into accelerators.** Hutton, A. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9201105-1: Advanced photon source reliability workshop, Argonne, IL (United States), 29-31 Jan 1992). Order Number DE92019902. Source: OSTI; NTIS; INIS; GPO Dep.

For the next generation of high performance, high average luminosity colliders, the "factories," reliability engineering must be introduced right at the inception of the project and maintained as a central theme throughout the project. There are several aspects which will be addressed separately: Concept; design; motivation; management techniques; and fault diagnosis.

31443 (SSCL-428) **Modification to footprint to accommodate an external fixed-target hall.** Murphy, C.T. (Fermi National Accelerator Lab., Batavia, IL (United States)); Stefanski, R. Superconducting Super Collider Lab., Dallas, TX (United States). Sep 1989. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. Order Number DE92040646. Source: OSTI; NTIS; INIS; GPO Dep.

Based on a note from C.T. Murphy on SSC Crystal Extracted Beams, we propose a modification to the footprint for the East Campus to accommodate an external beam area for 20-TeV protons. Because Murphy's analysis uses a somewhat out-of-date ring configuration, it had to be modified to fit the current machine parameters. However, the same principles were applied. (The revised Murphy note of 9/16/89 uses the current machine parameters and is consistent with this memo.) Basically, to avoid sitting in the halo of the hewn from IR6 and IR7, the external proton hall must sit 9000 ft downstream of the center of the utility straight on the East Campus. For a crystal-extracted beam of 108 protons per second, the beam would simply drift this entire distance to the experimental hall. Some quads might be installed if necessary to transport the beam to the ham or to shape the beam. If at some time in the future the full SSC were to be extracted, this drift could be used to form secondary beamlines for very-high-energy, fixed-target experiments with pion, kaon, or muon beams. In order to accommodate the possibility of full beam extraction, the muon vectors were chosen to be 17,000 ft long. The control of the land for this distance assures that no radiation will be allowed to leave the site, regardless of how the program might evolve in the future. This land need only be procured under stratified fee. At the end of this area, some land could be procured on a fee simple basis to provide a space for radiation monitors. This area could also be used ultimately for a future neutrino experiment.

31444 (SSCL-SR-1213) **Proceedings of the 1991 Symposium on the Superconducting Super Collider: "The Project, The Progress, The Physics".** Universities Research Association, Waxahachie, TX (United States). [1991]. 846p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. (CONF-9110225-: 1991 symposium on the Superconducting Super Collider (SSC), Corpus Christi, TX (United States), 13-17 Oct 1991). Order Number DE92040055. Source: OSTI; NTIS; INIS; GPO Dep.

This report contains viewgraphs and paper on the following topics: SSC project; SSC detectors; detector subsystem R&D at CERN and SSCL; and the physics relevant to SSC. (LSP).

4302 Beam Dynamics, Field Calculations, and Ion Optics

Refer also to citation(s) 31478, 31529

31445 (ANL/CP-76665) **Alternating-phase focusing: A model to study nonlinear dynamics.** Sagalovsky, L.; Delayen, J.R. Argonne National Lab., IL (United States). [1992]. 9p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9203174-1: International workshop on nonlinear problems in accelerator physics, Berlin (Germany), 30 Mar - 2 apr 1992). Order Number DE92019027. Source: OSTI; NTIS; INIS; GPO Dep.

We discuss a new model to study alternating-phase focusing (APF). Our approach is based on representing the accelerating electric field with a continuous phase modulated traveling wave. The resulting nonlinear equations of motion can be solved analytically to predict the regions of stable APF motion. We also identify the key parameters which adequately describe the physics of APF. The model is believed to be applicable to low-β ion linacs with short independently-controlled superconducting cavities being developed at ANL.

31446 (BNL-47266) **Bunched beam stochastic cooling.** Wei, Jie. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706-14: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019221. Source: OSTI; NTIS; INIS; GPO Dep.

The scaling laws for bunched-beam stochastic cooling has been derived in terms of the optimum cooling rate and the mixing condition. In the case that particles occupy the entire sinusoidal rf bucket, the optimum cooling rate of the bunched beam is shown to be similar to that predicted from the coasting-beam theory using a beam of the same average density and mixing factor. However, in the case that particles occupy only the center of the bucket, the optimum rate decrease in proportion to the ratio of the bunch area to the bucket area. The cooling efficiency can be significantly improved if the synchrotron side-band spectrum is effectively broadened, e.g. by the transverse tune spread or by using a double rf system.

31447 (BNL-47267) **Tune spread due to magnetic multipoles in RHIC.** Wei, J.; Harrison, M. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706-15: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019251. Source: OSTI; NTIS; INIS; GPO Dep.

Analytical expressions have been obtained of the amplitude and momentum dependence of the transverse tunes due to magnetic multipoles and orbit misalignment. Based on these expressions, compensation methods are developed to minimize the tune spread in RHIC with the $\beta^* =$ Im design.

31448 (BNL-47806) **The partial beam lifetime at RHIC due to Coulomb dissociation of the nucleus.** Rhoades-Brown, M.J.; Weneser, J. Brookhaven National Lab., Upton, NY (United States). Jul 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (AD/RHIC-110). Order Number DE92019256. Source: OSTI; NTIS; INIS; GPO Dep.

During beam crossing at RHIC, the Lorentz contracted Coulomb interaction between the heavy ions will excite internal modes of the nucleus. The subsequent decay of these modes is predominately via single or multiple nucleon emission. Changing the atomic mass Of the beam ion will eventually cause beam intensity loss at RHIC for the radius of the ion orbit is sensitive to changes of the ratio Z/A. While calculations for this beam loss mechanism have been made, it is now clear that these earlier theoretical studies underestimated the Coulomb dissociation loss rate for they appear to have included only a limited range of internal nuclear excitation energy. In this report we reexamine the question of Coulomb dissociation cross sections at RHIC by including internal excitation energies up to thousands of GeV. In addition, we utilize experimental photonuclear absorption cross sections when evaluating the dissociation cross section. Also, internal excitation of a nucleus in one beam wig result in both energy loss and transverse momentum change of an ion in the colliding beam. These recoil effects will be examined in detail to determine if there is an additional loss rate for ions out of the rf bucket or a non-negligible change in the ion's betatron momentum.

31449 (BNL–47813) **Topics on RF beam control of a synchrotron.** Zhang, S.Y.; Weng, W.T. Brookhaven National Lab., Upton, NY (United States). 13 Jul 1992. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (AGS/AD–92-3). Order Number DE92019217. Source: OSTI; NTIS; INIS; GPO Dep.

In this paper, several typical situations of longitudinal motion in synchrotron design and operation are studied. The study is based on a unified beam dynamic model of synchrotron oscillation under phase and radial feedbacks. Cases studied include frequency error, lock-in range, bunch excursion, phase manipulation, injection and field errors.

31450 (CEA-LNS-GT–91-08) **Helical siberian snake.** Nghiem, P. Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1991. 35p. (In French). Order Number DE93701142. Source: OSTI; NTIS (US Sales Only); INIS.

Dipoles revolved round the beam axis compose the helical siberian snakes that can be calculated systematically and induce low enough orbital distortions. HELSNA, a computer code is realized and allows to calculate siberian snakes in all possible configurations.

31451 (CEA-LNS-GT–92-01) **A numerical method for the ray-tracing of polarized beams.** Meot, F. Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1992. 3p. (CONF-920315–: 3. European particle accelerator conference, Berlin (Germany), 24-28 Mar 1992). Order Number DE93701201. Source: OSTI; NTIS (US Sales Only); INIS.

A numerical methods for solving the Thomas-BMT differential equation is presented. It has been implemented in the ray-tracing code Zgoubi. This is illustrated by ray-tracing in the spectrometer SPES 2 and multiturn tracking of resonant depolarization in the synchrotron Saturne.

31452 (CEA-LNS-GT–92-04) **Comparison of computational methods and results concerning the simulation of IH structures with the codes LORAS and DYNAC.** Valero, S. (Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)); Lapostolle, P.; Tanke, E. Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1992. 4p. Order Number DE93701203. Source: OSTI; NTIS (US Sales Only); INIS.

The authors compare the computational methods and results concerning the simulation of IH structures with the codes LORAS and DYNAC and try to explain the observed differences. 4 tabs., 4 figs.

31453 (GANIL-A–91-04) **Capacitive beam position monitors and automatic beam centering in the transfer lines of Ganil.** Gudewicz, P.; Petit, E. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 4p. (CONF-910505–: 1991 Institute of Electrical and Electronics Engineers (IEEE) particle accelerator conference (PAC), San Francisco, CA (United States), 6-11 May 1991). Order Number DE92570069. Source: OSTI; NTIS (US Sales Only); INIS.

A non-interceptive beam position monitor, made of four capacitive electrodes, has been designed at GANIL in order to allow a permanent measurement of the ion beam position over a large intensity range (50 enA to 10 eμA). Signal processing is based on a 10 kHz heterodyne and on an amplitude to phase conversion in order to measure the beam position. An immediate application of these monitors is the automatic beam centering. For this, two algorithms have been developed using the information on the center of gravity given by the beam position monitors which is then fed back to the steerers, an iterative method and a variational method. Both methods have been used on a section of beam line and have given similar and encouraging results. The next step is to center the beam on the completely equipped line. (author) 4 refs., 2 figs., 1 tab.

31454 (IPNO–1990/1, pp. 13-15) **Polarized electron physics at ELSA.** Reichelt, T. (Bonn Univ. (Germany)). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The advantages of pulsed electron accelerators which feed a stretcher ring, such as in the ELSA facility, are considered. Two types of resonances were observed, the imperfection resonances and the intrinsic resonances, causing depolarization. The polarized electron beam has been applied for experiments to study the Drell-Hearn-Gerassimov sum rule, and to examine neutron electric form factor. (R.P.) 4 refs.

31455 (JINR-E–9-91-156) **Theoretical treatment of a classical transverse feedback system using Z-transform.** Zhabitskij, V.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1991. 10p. Order Number DE92644290. Source: OSTI; NTIS (US Sales Only); INIS.

The equation including the kick effect and the equation corresponding to the pick-up signal transformation with digital electronics in feedback are obtained for a classical transverse feedback system in an accelerator. The solution of these matrix equations has been found using Z-transform to be applied widelyfor the analysis of discrete time systems. These solutions are analyzed for an ideal feedback and for a feedback with a notch filter. The stability criterion for such damper systems is obtained. The damping rates for different distances from pick-up to kicker are found. The stability criterion and the dependences on graphics for damping rates are shown for LHC (CERN). 7 refs.; 5 figs.

31456 (JINR-R–9-91-91) **The z-transform application for solving the problem of free beam oscillation damping in the accelerator.** Zhabitskij, V.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1991. 18p. (In Russian). Order Number DE92644294. Source: OSTI; NTIS (US Sales Only); INIS.

The theoretical approach to damper system for free coherent betatron oscillations in the accelerator is discussed. The damper system for each of two directions of beam transverse oscillations includes two pairs of pick-up electrodes (PU) and damping kickers (DK) connected by delayed negative feedback with a gain-transfer characteristic K. The matrix equation to determined beam parameters has been obtained. The transformation matrix for a full revolution includes the effect of kicker and PU-signal transformation in feedback. The Z-transform method is used to solve this matrix equation. This method is convenient for analyzing feedback systems with digital electronics and has wide applications in discrete time systems. The decision is analyzed for different PU and DK locations and gain K to find parameters of damper system where betatron oscillations are stable. The influence of a notch filter is under consideration. In turns out that maximum damping rate for feedback with a notch filter has been obtained for such PU and DK locations and gain K which differ from their values for feedback without a notch filter. 9 refs.; 7 figs.

31457 (JINR-R–9-91-226) **Determination of the synchronous phase in a phasotron.** Onishchenko, L.M.; Shakun, N.G.; Shishkin, A.L.; Shishdyannikov, P.T. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 12p. (In Russian). Order Number DE92644291. Source: OSTI; NTIS (US Sales Only); INIS.

Two new methods of the synchronous phase determination in a phasotron are described. The results of measuring the synchronous phase in the JINR phasotron are presented. 6 refs.; 6 figs.; 2 tabs.

31458 (JINR-R–9-91-246) **The stability of the damper system for the coherent transverse oscillations of the beam in a synchrotron.** Zhabitskij, V.M. (Joint Inst. for Nuclear Research, Dubna (USSR)); Korenev, I.L.; Yudin, L.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1991. 14p. (In Russian). Order Number DE92644292. Source: OSTI; NTIS (US Sales Only); INIS.

The investigation of the direct alternating kicker current perturbation influence of the particle motion in synchrotron with the beam coherent transverse oscillation damper in feedback are obtained. It has been shown that for a some pick-up and kicker placements are impossible due to this reason. The resonance conditions and their dependences on feedback gain-transfer characteristic have been found. The numerical results are given for the damper systems in UNK-1 and LHC. 6 refs.; 5 figs.

31459 (JINR-R–9-91-301) **Systems for study on spatial beam characteristics based on CCD.** Tsambel, V.; Voevodin, M.A.; Datskov, V.I.; Kovalenko, A.D.; Larin, A.A.; Sajfulin, Sh.Z. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 6p. (In Russian). Order Number DE92644293. Source: OSTI; NTIS (US Sales Only); INIS.

A system for the on-line diagnostics of spatial sizes and particle density distribution based on a called CCD camera operating over a wavelength interval of 400-1100 nm has been developed. It was tested for beam monitoring at the synchrophasotron accelerating complex in an intensity range of 10^3-10^{12} part/cm and for energies of 10-10^4 MeV. CCD matrix cooling leads to lower noises and provides a longer storage in a CCD cell. The system hardware, software, cryogenic and optical parts are also described. 4 refs.; 2 figs.

31460 (LAL-RT–91-08) **Focusing characteristics of an accelerating structure with non-circular beam holes.** Hanaki, H. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Jul 1991. 14p. Order Number DE92570118. Source: OSTI; NTIS (US Sales Only); INIS.

High energy linacs of the next generation are required to keep stably high bunch populations and very small beam spots at colliding points, in order to realize high luminosity at TeV energy region. CERN proposed to apply the rf focusing technology which makes a strong focusing force according to the rf phase within a bunch, and rf focusing power is proportional to both the accelerating gradient and the operating frequency. Some computed results of the focusing property of 3 GHz accelerating structures are presented which has non-circular beam holes. The construction of this 3 GHz structure, because an rf technology for 3 GHz is well-established, will be useful in order to know, at an early stage of the development, whether the idea will be successful or not. The 3D code MAFIA was used to investigate the deflecting force caused by the asymmetry of the beam aperture. (R.P.) 5 refs., 14 figs., 3 tabs.

31461 (LA-UR–92-2583) **Linac beam dynamics calculations for low-current large-emittance beams.** Swain, G.R.; Butler, H.S. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109–8: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040345. Source: OSTI; NTIS; INIS; GPO Dep.

The beam in PILAC, a superconducting linac for pions proposed at LAUFF, will have a lager momentum spread (7% dp/p) and occupy a larger transverse space (13 cm dia. bore) than is usual in high-beta linacs. To find the effects of this large phase space, a cavity element is being added to the MOTER code. With this addition, pions and other particles may be tracked through the injection line and the PILAC linac. In one option, the particles may be cell by cell through a multicell cavity using formulas. The formulas are derived by integrating the energy gain and transverse impulse from the fields in a cell along the path of the particle. What is new in this analysis is that the transverse momentum is considered to be a significant part of the total momentum. The effect of a difference in velocity from the design velocity of the structure is considered. In another option still under development, field information is specified, and the particles may be tracked by stepwise integration.

31462 (NIKHEF-K-AmPS–92-01) **Using the 16 viewscreens during commissioning of AmPS.** Maas, R. Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie K. Feb 1992. 7p. Order Number DE93602011. Source: OSTI; NTIS; INIS.

In order to reach the stage where only one may attempt to correct the machine closed orbit (CO), the beam should travel for at least one turn around the machine. To do so, AmPS is considered as a beamline. The beam will then be transported from one viewscreen (BV-monitor) to the next one, corrected each time by a preceding orbit corrector (OCh/v-pair). Simulations show that this procedure always improves the rms-value of the observed deviations at the viewscreens, and generally also reduce the value of the maximum beam excursions. (author). 1 fig.; 6 tabs.

31463 (SAND–91-1492C) **Propagation of relativistic high current electron beams across the geomagnetic field.** Wagner, J.S. Sandia National Labs., Albuquerque, NM (United States). [1991]. 7p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9107232–1: NATO advanced study institute program on the behavior of systems in the space environment, Pitlochry (United Kingdom), 6-21 Jul 1991). Order Number DE92018276. Source: OSTI; NTIS; GPO Dep.

Relativistic high current electron beams can be transported long distances across the geomagnetic field using the IFR (Ion focused Regime) technique. IFR is a method of providing strong electrostatic focusing and guiding of the beam. The guiding is sufficiently strong to allow the beam to transport any angle with respect to geomagnetic field. In the IFR method, first an ionizing laser (or any ionizing method) is used to create a preionized cylindrical channel.

31464 (SLAC-PUB–5725) **A simple model for SLC positron stability issues.** Krejcik, P.; Ziemann, V. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jun 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-920405–1: Spring meeting of the American Physical Society, Washington, DC (United States), 12-20 Apr 1992). Order Number DE92019644. Source: OSTI; NTIS; INIS; GPO Dep.

A simple model is constructed for the SLC positron system to describe the intensity variations induced by beam loading in the linac. It is found that the system can be described by the well known logistic equation. This allows us to use results from the stability analysis to characterize the positron system, to place tolerances on fluctuations. and to slow variations on the scavenger beam intensity.

31465 (SLAC-PUB–5742) **Beam-beam diagnostics from closed-orbit distortion.** Furman, M. (Lawrence Berkeley Lab., CA (United States)); Chin, Y.H.; Eden, J.; Kozanecki, W.; Tennyson, J.; Ziemann, V. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515 ;AC03-76SF00098. (LBL–31888;ESG–167;CONF-920706–16: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019397. Source: OSTI; NTIS; INIS; GPO Dep.

We study the applicability of beam-beam deflection techniques as a tuning tool for asymmetric B factories, focusing on PEP-II as an example. Assuming that the closed orbits of the two beams are separated vertically at the interaction point by a local orbit bump that is nominally closed, we calculate the residual beam orbit distortions due to the beam-beam interaction. Difference orbit measurements, performed at points conveniently distant from the interaction point (IP), provide distinct signatures that can be used to maintain the beams in collision and perform detailed optical diagnostics at the IP. A proposal to test this method experimentally at the TRISTAN ring is briefly discussed.

31466 (SLAC-PUB–5830) **The accuracy of beam-beam diagnostics for circular colliders.** Ziemann, V. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9204126–6: B factories: state of the art in accelerators, detectors, and physics, Stanford, CA

(United States), 6-10 Apr 1992). Order Number DE92019641. Source: OSTI; NTIS; INIS; GPO Dep.

We investigate the potential of beam-beam deflection techniques for the determination of spot sizes, tilt angle, centering, and angular divergence for circular colliders. Achievable accuracies for all measured quantities are estimated.

31467 (SSCL-512) **Low frequency transverse resistive instability in the collider.** Briggs, D. Superconducting Super Collider Lab., Dallas, TX (United States). Jun 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. Order Number DE92040427. Source: OSTI; NTIS; INIS; GPO Dep.

The large scale size of the Superconducting Super Collider (SSC) collider rings makes it possible for the multibunch resistive instability to occur at very low frequencies (e.g., less than 1 kHz). For the lowest allowed frequencies, the skin depth is generally larger than the thickness of the copper layers that will be placed on the inner diameter of the beam tube, or on a synchrotron radiation intercept tube (liner) if a decision is made to go that route. In this regime, the formulas derived earlier describing the transverse interaction impedance (Z⊥) are not complete enough to predict the dependence of the interaction impedance on copper layer thickness, or frequency, over the full range. The main purpose of this note is to present a general formulation of the interaction impedance that connects the various limiting cases. In particular, this formulation predicts a maximum value for the instability growth rate (Re Zj⊥) as a function of thickness, or frequency. In Section 2.0, a simplified derivation of the multibunch transverse instability growth rate in the low frequency regime is given, for completeness. Conditions for stabilization with a spread in the betatron tune are also derived. In Section 3.0, the general expression for low-frequency interaction impedance is developed. In Section 4.0, we discuss the requirements on copper layer thickness to limit the growth rate of the mode to acceptable values in the SSC collider rings. The conditions for stabilization of the mode with space-charge tune spread at injection, or beam-beam tune spread at full energy, are also given.

31468 (SSCL-578) **Longitudinal beam dynamics with rf noise.** Shih, H.J. (Superconducting Super Collider Lab., Dallas, TX (United States)); Ellison, J.A.; Cogburn, R.; Newberger, B.S. Superconducting Super Collider Lab., Dallas, TX (United States). Jul 1992. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. Order Number DE92040645. Source: OSTI; NTIS; INIS; GPO Dep.

The Dome-Krinsky-Wang (DKW) diffusion-in-action theory for rf-noise-induced emittance dilution is reviewed and related to recent work on the approximation of stochastic processes by Markov processes. An accurate and efficient numerical procedure is developed to integrate the diffusion equation of the DKW theory. Tracking simulations are undertaken to check the validity of the theory in the parameter range of the Superconducting Super Collider (SSC) and to provide additional information. The study of effects of rf noise is applied to two problems of interest at the SSC: (1) determination of noise tolerance levels in the rf system, and (2) feasibility of beam extraction using crystal channeling.

31469 (SSCL-580) **Magnetic field perturbation caused by bending vibrations of a quadrupole.** Lebedev, V.; Stupakov, G. Superconducting Super Collider Lab., Dallas, TX (United States). Jul 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. Order Number DE92040644. Source: OSTI; NTIS; INIS; GPO Dep.

Bending vibration of a magnet body supported at two symmetric points is studied. The magnet is modeled by a slender elastic beam. The resonant frequencies are found and the averaged displacement of the magnet is calculated as a function of the frequency.

4303 Auxiliaries and Components

Refer also to citation(s) 30781, 31243, 31449, 31462, 31468, 31538, 31542, 31614

31470 (ANL/CP-76582) **Thermal imaging of synchrotron beams on silicon crystals.** Smither, R.K. Argonne National Lab., IL (United States). Jun 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9207128-1: Quantitative infrared thermography, Chatillon Cedex (France), 7-9 Jul 1992). Order Number DE92018182. Source: OSTI; NTIS; INIS; GPO Dep.

Advanced Photon source, a next generation synchrotron source, currently under construction at Argonne National Laboratory, will deliver large thermal loads of 1 to 10 kW to the first optical elements (usually a silicon crystal) in the synchrotron, x-ray beam lines. The first optical elements will distort and attenuate the x-ray beam if they are not extremely well cooled. An infrared camera is used to monitor the temperature distribution of the these first optical elements. This measurement is complicated because the silicon crystal is transparent to the infrared radiation and requires a special approach to the analysis of the data to get a meaningful temperature for the crystal.

31471 (ANL/CP-76610) **A short-orbit spectrometer for Hall C.** Jackson, H.E. (Argonne National Lab., IL (United States)); Kowalczyk, R.S.; Potterveld, D.H.; Zeidman, B.; Boudrie, R.L.; Hart, V.E. Argonne National Lab., IL (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9206203-2: CEBAF summer workshop, Newport News, VA (United States), 15-19 Jun 1992). Order Number DE92019030. Source: OSTI; NTIS; INIS; GPO Dep.

A short-orbit spectrometer capable of detecting particles with momentum < 2.0 GeV/c with moderate energy and angular resolution will be available in Hall C for operations in coincidence with the HMS spectrometer or for stand alone operation. The design is based on a QD(-D) configuration which can meet the needs of a broad spectrum of studies appropriate to Hall C. Measurements will be possible for angles of up to 20 degrees out of plane.

31472 (ANL/CP-76664) **An engineering upgrade of the CWDD injector.** Pile, G.D. (AEA Technology, Culham (United Kingdom)); Carwardine, J.A.; Cooke, M.B. Argonne National Lab., IL (United States); AEA Technology, Culham (United Kingdom). [1992]. 7p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. Contract 20272401. (CONF-9204170-2: Neutral particle beam technical symposium and scientific exchange, Argonne, IL (United States), 28 Apr - 1 may 1992). Order Number DE92018787. Source: OSTI; NTIS; GPO Dep.

The majority of injector operation at Culham was performed at voltages below the 2OOkV level required for Radio Frequency Quadrupole (RFQ) operation. Whilst many shots were obtained at 2OOkV, operation was considerably more difficult since the supporting subsystems were unable to withstand effects of high voltage breakdowns at this level. Additionally, there were some outstanding issues with regard to full commissioning of the beam transport system. This paper describes the strategy for upgrading the injecter system reliability to the levels required for commissioning and operation of the RFQ.

31473 (ANL/CP-76667) **Utilization of databases to manage resources.** Sheridan, T. Argonne National Lab., IL (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209160-4: International symposium on energy, environment and information management, Argonne, IL (United States), 15-18 Sep 1992). Order Number DE92019598. Source: OSTI; NTIS; GPO Dep.

This paper describes how databases are used by the Advanced Photon Source (APS) Project at Argonne National Laboratory to help manage the project and its resources. It documents our experiences in implementing database technology in a large scientific project. Some of the topics that will be discussed include: The APS database environment; decentralizing databases; extending the database environment (graphical, spreadsheet and barcode interfaces);choosing a database; and software development issues.

31474 (BNL-47103) **Longitudinal impedance of capacitive pick-up electrodes: Calculations and comparison with measurements.** Blaskiewicz, M.; Luccio, A.; Ratti, A.; Shea, T.J. Brookhaven National Lab., Upton, NY (United States). [1992]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706-19: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019499. Source: OSTI; NTIS; INIS; GPO Dep.

In order to obtain high sensitivity over a broad frequency range, split cylinder capacitive pick-up electrodes have been adopted as the beam position monitors (BPMs) for the AGS booster. Numerical simulation and prototype measurements have been employed to find the coupling impedance of a BPM. The impedance was calculated using the MAFIA computer codes, and measurements were made using a coaxial wire. We found that the measured impedance depended strongly on external electronics, which could not be modeled using the computer code. Additionally, the calculated impedance is a function of beam velocity, which was not studied in the measurements. Only by using both could a reliable bound on the shunt impedance be obtained. We find that the longitudinal impedance of the BPMs is negligible for normal operating conditions in the booster.

31475 (BNL–47104) **The RF beam control system for the Brookhaven AGS synchrotron.** Brennan, J.M. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706–18: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019500. Source: OSTI; NTIS; INIS; GPO Dep.

The new 1.5 GeV Booster synchrotron completes the injector chain for the Relativistic Heavy Ion Collider, RHIC. It enables the AGS to accelerate all heavy ions to 14 GeV/c for collider operation and also in the intensity of the AGS for fixed-target experiments by a factor of four. The ultra-high vacuum enables acceleration of partially stripped ions from the Tandem Van de Graaff to energies sufficient for complete stripping. For high intensities, it accelerates the 200 MeV linac beam in four batches of three bunches per AGS cycle. At 1.5 x 10^{13} protons per batch, it has the same space charge tune spread as the AGS at 200 MeV. This variety of applications means the Booster must accommodate a very wide range of particle masses and intensities. Since it operates in a Pulse-by-Pulse Modulation mode at 7.5 Hz, the computer controlled functions of time and magnetic field, and the 64 timing triggers of the beam control system take on unique values for each of four PPM users. Beams of $^{197}Au^{+33}$ ions and protons have been accelerated in the same PPM cycle.

31476 (BNL–47119) **The operational status of the Booster injector for the AGS accelerator complex at BNL.** Ahrens, L.; Bleser, E.; Brennan, J.M.; Gardner, C.; Gill, E.; Glenn, J.W.; Reece, K.; Roser, T.; van Asselt, W.; Weng, W.T. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706–20: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019498. Source: OSTI; NTIS; INIS; GPO Dep.

The Booster synchrotron at Brookhaven National Laboratory has been incorporated into the accelerator chain at the Alternating Gradient Synchrotron (AGS) complex. After a successful first commissioning effort in the spring of 1991, the Booster has been part of this year's silicon, gold and proton physics runs. After a brief review of the Booster design goals, and of the early commissioning, this paper will summarize this year's activities.

31477 (BNL–47148) **Operational status of the AGS Booster Main Ring Magnet Power Supply.** Soukas, A.; Bannon, M.; Geller, J.; McNerney, A.J.; Sandberg, J.; Toldo, F.; Zhang, S.Y. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706–25: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019451. Source: OSTI; NTIS; INIS; GPO Dep.

The Booster is a multipurpose accelerator interposed between a 200 MeV linac, a pair of 15 MV Tandem Van deGraaf accelerators, and the AGS. It can operate on slow cycles of 0.3 Hertz pulse repetition frequency up to a maximum of 7.5 Hertz. The different cycles, from long front porches for long injection or accumulation periods or flattops for slow extraction, to normal fast extraction cycles, accommodate protons, heavy ions (h.i.) and polarized protons. One of the systems enabling the flexible Booster operation is the Main Ring Magnet Power Supply (MRPS) system. It consist of a series connection of six, 1000 volt, multiphase rectifiers together with by pass switches. Two of the six operate at currents up to 6 kA and the rest up to 3 kA. All bypass switches are rated for 6 kA. The system is equipped with passive, damped LCRC filters as well as an active transformer coupled correction system. The MRPS is connected directly to the Long Island 69 Kv bus via a dedicated 20 MVA transformer. The choice of a series of modules enables the very flexible cycle generation and at the same time minimizes the deleterious effects of power factor and harmonics on the ac lines.

31478 (BNL–47149) **Rf beam loading in the Brookhaven AGS with booster injection.** Zhang, S.Y.; Raka, E.; Weng, W.T. Brookhaven National Lab., Upton, NY (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920706–24: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019452. Source: OSTI; NTIS; INIS; GPO Dep.

Multi-batch bunched beam loading during injection from the Booster to the AGS will be discussed. The full intensity beam injection to the upgraded AGS rf system with beam phase and radial feedbacks will be studied. It is shown that a beam phase feedback is necessary in order to guarantee a predictable hewn behavior after the first batch injection, otherwise the initial phase deviation for the following batch injections cannot be controlled. However, the effectiveness of the phase feedback control of the transient beam loading may be limited by an emittance blow up in the process. It is shown that a fast power amplifier feedback with a moderate gain can significantly reduce the transient effect of the bunched beam injection.

31479 (BNL–47799) **Preliminary study of AC power feeders for AGS booster.** Meth, M. Brookhaven National Lab., Upton, NY (United States). 17 Jul 1992. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (AGS/AD–92-7). Order Number DE92019253. Source: OSTI; NTIS; INIS; GPO Dep.

It has been proposed that the AGS Heavy Ion/Proton Booster be excited directly from the electric power distribution system without intervening an energy storage buffer such as an MG set or a magnetic energy buffer. The average power requirement of the AGS Booster is less than many single-loads presently housed on the lab site. However, the power swing will be the largest single pulsating load on the lab site. The large power swings will impact on the power grid producing utility-line disturbances such as voltage fluctuations and harmonic generation. Thus, it is necessary to carefully evaluate the quality of the electric power system resulting from the interconnection, such that the utility system is not degraded either on the lab site or at LILCO's substation.

31480 (BNL–47800) **Spectrum analysis of the power line flicker induced by the electrical test of the prototype Booster dipole.** Meth, M. Brookhaven National Lab., Upton, NY (United States). 17 Jul 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (AGS/AD–92-6). Order Number DE92019246. Source: OSTI; NTIS; INIS; GPO Dep.

Testing of the prototype Booster dipole magnet at full current produced measurable disturbances of the beam position at the National Synchrotron Light Source. Power for the magnet and the NSLS are distributed from three substation transformers at Temple Place. Normally the substation configuration is for two independent 13.8 KV buses, derived from the 69 KV LILCO distribution. The buses are connected through a circuit breaker that is normally open circuited. Power for the magnet test is derived from one of the 13.8 KV buses and power for the NSLS is derived from the second bus. Coupling of the pulsating magnet load and the NSLS is at the 69 KV level. However, on the days that the interference was first observed at the NSLS only one-half of the substation transformers at Temple Place were in service. The 13.8 KV tie breaker was closed and the full substation load was supplied from this common bus. Thus the coupling between the pulsating magnet load and the NSLS was at the 13.8 KV level. Establishing the normal two bus configurations at Temple Place appeared to reduce the disturbance.

These events suggested a controlled experiment to measure the magnet power swing and the induced powerline flicker; and from these measurements project the flicker on the lab site generated by the Booster operating at full energy. This experiment could corroborate the validity of the electrical models used in analyzing the power flow from the LILCO power grid and its distribution on the Lab site described in Accelerator Division Technical Note 220.

31481 (BNL–47811) **Frequency spectrum generated by AGS Booster power swing, heavy ion cycle.** Meth, M.; Ratti, A. Brookhaven National Lab., Upton, NY (United States). 17 Jul 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (AGS/AD–92-5). Order Number DE92019220. Source: OSTI; NTIS; INIS; GPO Dep.

LILCO is studying the effects of the AGS Booster power swing on its power grid. The study is being conducted by GE systems Development and Engineering, Schenectady, New York. In notes, dates November 10, 1987, prepared for a GE-LILCO Progress Review Meeting, the author notes LILCO system resonances that are excited by the heavy ion cycle. The data used by GE for their study, is the power flow required for continuous operation of the Booster, namely a continuous 13MW Power swing and a period of one second. The data used by GE came from BNL reports, used to analyze the power line flicker generated by this pulsating load. It is a worse case study and does not represent the Booster cycle. The Booster must be synchronized with the AGS, which is operated with a period of 3 seconds, when accelerating heavy ions. Thus the Booster duty cycle is 1/3 with a peak power swing of 13MW. The time of one second used to cycle the Booster magnets is arbitrary and can be increased to a maximum of three seconds. The peak power swing and the power spectrum are modified by the Booster duty cycle and period. The spectrum is critical for the GE study of the LILCO grid.

31482 (CNIC–00373) **Relativistic cloud-in-cell simulation of free-electron laser (FEL) with considering space charge effects.** Zhang Jiatai (Institute of Applied Physics and Computational Mathematics, Beijing, BJ (China)); Xu Linbao; Chang Tieqiang. China Nuclear Information Centre, Beijing, BJ (China). Apr 1990. 15p. (In Chinese). (IAPCM–0011.). Order Number DE93602023. Source: OSTI; NTIS (US Sales Only); INIS.

An one and a half dimensional (one space dimension and two velocity components) relativistic electromagnetic cloud-in-cell simulation code CIC-R, which is suitable for simulating FEL process, has been developed. By using this code the temporal evolution of FEL is simulated and the linear growth rate of unstable spectra (For one simulation the growth rate is 0.07 which is in good agreement with the theoretical data.), dispersion relations of coupling of pump waves, the electromagnetic and electrostatic waves are obtained. Other results such as the behaviour of electron distribution function, electrons bunching in phase space, nonlinear saturation and efficiency of energy conversion are also considered. Besides the multi-mode particle simulation, a single-mode wave-particle code (SMWPC) is developed. It is based on the simplified single-mode theory which was obtained from equations of electron motion and radiation field derived strictly under one dimension assumption and single-mode approximation. Using this code a 3.459 mm Raman FEL has been simulated. The higher gamma and tapered wiggler of FEL are also simulated. The results show that the efficiency can reach to 48% if the tapered wiggler field and other parameters are properly designed.

31483 (CNIC–00374) **One and three dimensional numerical simulation of millimeter wave fel amplifiers with rectangular waveguide.** Yang Zhenhua (Institute of Applied Physics and Computational Mathematics, Beijing, BJ (China)); Wang Taichun; Tian Shihong; Jiang Youming; Ding Wu. China Nuclear Information Centre, Beijing, BJ (China). Apr 1990. 15p. (In Chinese). (IAPCM–0012.). Order Number DE93602024. Source: OSTI; NTIS (US Sales Only); INIS.

The calculation, analysis and comparison of the nonlinear evolution of free electron (FEL) amplifier, which consists of realizable Wigglers such as linearly polarized Wiggler with quadropole focusing and parabolic pole face Wiggler, have been carried out by a 3-D computer code FEL-2-A. The FEL-2-A which is based on the single-particle theory is composed of a set of nonlinear differential equations. These equations include the differential equations describing the self-consistent evolution of TEmn and TMmn modes in a loss-free rectangular waveguide and electron trajectories effected by photo fields. The paraxial and adiabatic slow-varying approximation have been used. The space charge forces have been neglected. The initial distribution of electron beam in phase space (γ, ψ, χ_j, ξ_{xj}, $j = 1,2$) is provided by Monta Carlo method. The numerical results of FEL-2-A have been compared with those of FRED and the experimental data of LLNL (TE_{01}). The result is satisfied. Using this code, the FEL output power effected by the different linearly polarized Wiggler forms, input power and other relevent parameters has been studied. All these primary simulation results are useful for designing 4 MeV FEL amplifier and its experiment. In this code, the resonant particle equations are used in design phase. It provided the amplitude and/or wavelength of Wiggler for simulation, so the variation of Wiggler is tailored carefully to match the electron energy and the output power is enhanced greatly. The longitudinal space charge force has been considered. All of these considerations will be given in another paper.

31484 (GANIL-P–92-04) **A non interceptive heavy ion beam profile monitor based on residual gas ionization.** Anne, R. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Georget, Y.; Hue, R.; Tribouillard, C. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1992. 17p. Order Number DE93703437. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nucl. Instrum. Methods (NL).

A beam profile monitor has been developed at GANIL based on the ionization of the residual gas under the impact of the high energy heavy ions of the beam. The charged ions of the residual gas drift onto a micro-channel plate (MCP), by means of an electrostatic field, yielding a signal collected on a multistrip-anode, and providing the spatial distribution of the beam. Calculations and results are presented as well as discussions about the different parameters of the device. (author) 7 refs., 10 figs.

31485 (IPNO–1990/1, pp. 59-68) **The Orsay polarized electron source.** Arianer, J. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Aminoff, C.G.; Brissaud, I.; Essabaa, S. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

An intense source of spin-polarized electrons with the highest possible figure of merit was decided to be constructed. Its aim is to apply it at an existing European electron synchrotron like NIKHEF during 1993. The electron source uses optically pumped flowing helium afterglow, similarly to the design of the Rice University Source. The design and operation of the polarized electron source is described, its status, preliminary results and future perspectives are discussed. (R.P.) 5 refs., 6 figs.

31486 (IPNO–1990/1, pp. 69-78) **Polarized electron sources for stretcher/storage rings.** Norum, B.E. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie K). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

Large components of the research programs envisaged for the stretcher/storage rings nearing completion at the Bates Linear Accelerator Laboratory and NIKHEF-K involve the use of stored, longitudinally polarized electrons and polarized internal targets. A comparison has been made between the two technologies currently being pursued for the construction of polarized electron sources. These are the photo-emissive cathode source (PECS) of the type pioneered at SLAC and the pumped helium source (PHS) initially studied at Rice University. In this comparison both parameters from existing sources and parameters based upon anticipated extrapolations thereof were used. The results of the comparison are analyzed. (R.P.) 11 refs., 4 figs.

31487 (IPNO–1990/1, pp. 79-84) **Compression of polarized ^{3}He.** Heil, W. (Mainz Univ. (Germany). Inst. fuer Physik). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

A status report is presented on the polarized ^{3}He target development work at the University of Mainz. It is based on the optical pumping of the $^3S_1$ state of ^{3}He with subsequent metastability spin exchange to the ground state atoms. This pumping scheme is very efficient at ^{3}He pressures of about 1 Torr; for high density targets, however, a mechanical compression of the polarized gas is needed in a second step. First results with a Toepler compression pump look promising and will be discussed in the following. (author) 10 refs., 4 figs.

31488 (JINR–8-90-66) **Multichannel recorder of transition processes in superconducting magnets.** Datskov, V.I.; Malinovski, Kh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1990. 8p. (In Russian). Order Number DE92644314. Source: OSTI; NTIS (US Sales Only); INIS.

Peculiarities of voltage registration in superconducting magnet during transition processes are described. A block-scheme of multichannel voltage recorder with divider up to 500 V is given. The recorder was tested during experiments with superconducting solenoid at currents of 30-200 A. Interesting results on normal zone behaviour before the superconducting magnet transition are obtained. 7 refs.; 6 figs.

31489 (JINR–9-91-76) **Calculation of the beam extraction system from the U-120K cyclotron.** Borisov, O.N.; Vorozhtsov, S.B.; Dmitrievskij, V.P.; Morozov, N.A.; Saenko, V.A.; Chesnov, A.F. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 8p. (In Russian). Order Number DE92644309. Source: OSTI; NTIS (US Sales Only); INIS.

The results of calculation of the beam extraction system from the U-120K isochronous cyclotron are presented. The method of excitation of radial oscillations and the process of the beam deflection through the magnetic field of the accelerator were investigated. The extraction system elements and their parameters are chosen. Extraction of the p(11-35 MeV), d(6-17 MeV), α(11-35 MeV) and He-3 (15-45 MeV) beams with $\geq$75% efficiency is assumed. 5 refs.; 5 figs.; 2 tabs.

31490 (JINR-R–9-90-581) **Calculation of ion charge-state distributions in ECR ion sources.** Shirkov, G.D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. 16p. (In Russian). Order Number DE92644306. Source: OSTI; NTIS (US Sales Only); INIS.

A new method of calculation of ion charge-state distributions in electron cyclotron resonance (ECR) ion sources is proposed. A system of nonlinear algebraic equations enables to take into account not only one-electron ionization and charge exchange but more complicated collision processes among the plasma components in the source. The ion temperature is defined as the result of a hot electron heating. In the limits of the offered model the connection between the density of neutrals, ions and electrons in the ECR ion source is determined. It is shown that the ion charge-state distribution depends mainly on the electron temperature; the increase density practically does not affect the main ion charge but leads to a sharp rise of the total ion current. The calculations of the ion charge-state distributions for the ECR ion source, which is being constructed in Dubna now, are carried out. 12 refs.; 12 figs.

31491 (JINR-R–9-91-83) **Geometry choice and calculation of the U-200T isochronous cyclotron accelerating system.** Glazov, A.A.; Zaplatin, E.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 7p. (In Russian). Order Number DE92644313. Source: OSTI; NTIS (US Sales Only); INIS.

An isochronous cyclotron for acceleration of light ions (p,d,α,^{3}He^{+2}) was suggested to be constructed the basis of the existing classical cyclotron U-150 aimed to accelerate protons up to the energy of 20 MeV. The dee aperture may be 3 cm and its width 190 cm at interpole magnet gap 12 cm. The working frequency must be changed within 11.4-20.5 MHz at proton accelerating in the range of 20-70 MeV. To provide the universal scceleration possibility of various particles on the main frequency harmonics using 180 deg-dee, the RF system main resonance frequency should be 7-21 MHz. It is suitable to use a plane resonance line with a panel frequency change as an RF accelerating system to provide the high stability of characteristics, tuning convenience and frequency change for U-200T. The results of one-, two- and three-dimensional calculations of this accelerating system is represented. 4 refs.; 8 figs.

31492 (JINR-R–9-91-255) **Upgrading of the stabilized direct-current power supply unit for the main winding of the iron-current channel at the JINR phasotron.** Akhmanov, V.V.; Batmanova, Eh.K.; Kazakova, G.G.; Kalinichenko, V.V.; Solomnikov, V.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 7p. (In Russian). Order Number DE92644312. Source: OSTI; NTIS (US Sales Only); INIS.

A 12.5 kA/12 V stabilized direct-current power supply unit is described. The current instability and pulsation are 10^{-3} at the operating current 11 kA. A specific feature of the power supply is a thyristor regulator of alternative voltage with phase regulation, installed on the primary side of the rectifier transformer. In the rectifier there are 24 power diodes of current rating 1 kA. The 12.5 kA current transducer based on magnetic comparison of direct currents is connected to the load circuit of the unit. The block diagram of the unit, the basic circuit of its blocks and the design of the isolator unit are given. 3 refs.; 6 figs.

31493 (JINR-R–13-91-245) **The system of standard currents.** Kosarev, I.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 8p. (In Russian). Order Number DE92644311. Source: OSTI; NTIS (US Sales Only); INIS.

The precision dc source with two outputs for 62.5 mA and 1A is described. The principle of receiving several currents from the original one by dc magnetic comparators is used in the source. The instability of the currents is $=-2x10^{-6}$. The system is intended for the dc magnetic comparators which are applied as detectors in stabilized supply sources. 6 refs.; 7 figs.

31494 (KEK-PROC–91-2(v.2), pp. 443-452) **Beam instrumentation for an H$^-$ cyclotron meson factory.** Mackenzie, G.H. (TRIUMF, Vancouver, BC (Canada)). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225–: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

The instrumentation of the TRIUMF 520 MeV high intensity H$^-$ cyclotron is enumerated and any unusual operating experience described. Since much of the instrumentation is similar to that used on other cyclotrons, and at other meson factories and spallation neutron sources, features associated with strippable H$^-$ ions or high average beam power will be emphasized. (author).

31495 (KEK-PROC–91-2(v.2), pp. 453-466) **Experience with the BEAMSCOPE emittance measurement system at the CERN PS Booster.** Schoenauer, H. (European Organization for Nuclear Research, Geneva (Switzerland)). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225–: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

BEAMSCOPE (Betatron Amplitude Scraping by Closed Orbit Perturbation) is a device developed more than a decade ago at the CERN Proton Synchrotron Booster (PSB). Its main use is for fast, automated emittance measurements at any moment in the acceleration cycle but is also allows the display of the distribution of betatron amplitudes, physical or normalized. Experience gained over the years and problems encountered are presented and results are related to other types of emittance measurement devices. (author).

31496 (KEK-PROC--91-2(v.2), pp. 467-493) **Beam position monitor using a reentrant coaxial cavity.** Bossart, R. (European Organization for Nuclear Research, Geneva (Switzerland)). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225--: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

A special beam position monitor is used in the enlarged straight sections of the SPS accelerator at CERN, in order to measure the position of the proton beam bunched at 200 MHz. A reentrant coaxial cavity connected to the circular vacuum chamber acts as shunt impedance for measuring the wall currents induced by the beam on the vacuum chamber. The coaxial cavity works at 200 MHz much below it's resonance frequency. Both the horizontal and vertical beam position can be measured by four orthogonal signal ports. A good response of the beam position monitor has been obtained as for signal power, precision of centre position, linearity of the position measurement and decoupling between horizontal and vertical position measurement. The total position error ϵ amounts to $\epsilon \leq \pm 0.6$ mm± 0.01 x, where x is the distance of the beam centre from the monitor centre, measured along the x-axis, for horizontal and vertical beam positions up to 60 mm. This paper describes the analysis of the reentrant coaxial cavity and it's application as a position monitor at very high frequencies. (author).

31497 (KEK-PROC--91-2(v.2), pp. 494-503) **Prompt bunch by bunch synchrotron oscillation detection via a fast phase measurement.** Briggs, D. (Stanford Linear Accelerator Center, Menlo Park, CA (United States)); Corredoura, P.; Fox, J.D.; Gioumousis, A.; Hosseini, W.; Klaisner, L.; Pellegrin, J.L.; Thompson, K.A.; Lambertson, G. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225--: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

An electronic system is presented which detects synchrotron oscillations of individual bunches with 4 ns separation. The system design and performance are motivated by the requirements of the proposed B Factory facility at SLAC. A comb generator is used to produce an eight cycle coherent tone burst at 3 GHz from each bunch. The phase of the coherent burst is compared with a master oscillator in a double balanced mixer. The detected mixer output is digitized at a 250 MHz rate, yielding a unique phase measurement for each bunch. Laboratory results are presented which show that the prototype is capable for measuring individual bunch phases with better than 0.5 degree solution at the 476 MHz RF frequency. A system design for damping longitudinal oscillations of 1658 bunches using this detector is also shown. (author).

31498 (KEK-PROC--91-2(v.2), pp. 504-513) **Beam monitors for rf feedback control in HIMAC synchrotron.** Kanazawa, M. (National Inst. of Radiological Sciences, Chiba (Japan)); Sato, K.; Itano, A. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225--: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

An rf control system for HIMAC synchrotron has been constructed, in which minimum and maximum acceleration frequencies are 1.0 and 7.8 MHz, respectively. To control this wide range frequency stably, a digital control system with a digital synthesizer (DS) has been adopted. To operate the synchrotron with low intensity beam of 10^7 particles/pulse(ppp), the low noise beam monitoring system of a position (ΔR) and a phase ($\Delta\phi$) have been developed. A beam test of the control system is now under way in TARN II at INS. The beam monitors and the rf control system are described together with the tested performance. (author).

31499 (KEK-PROC--91-2(v.2), pp. 514-517) **Method for the beam intensity measurement in a fast-cycling synchrotron.** Babayan, A.Z. (Erevanskij Fizicheskij Inst., Erevan (USSR)); Nickogossian, V.Ts.; Sadoian, K.A.; Toumanian, A.R. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225--: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

A novel idea is suggested in this paper and a device realizing it which enables with simple measurement of only one parameter of the intensity signal to define its value taking into account speed and duty factor changes of the beam orbit in the ring is described. (author).

31500 (KEK-PROC--91-14, pp. 1-13) **A use of EGS4 in the TOPAZ detector simulator.** Miyamoto, A. (National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan)); Kawabata, S.; Watanabe, Y.; Tauchi, T.; Tsukamoto, T.; Kuroda, S. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240--: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

We have installed EGS4 to the TOPAZ detector simulator to simulate electromagnetic showers in massive structures and check fictious interactions in low density regions, keeping the modularity of the system as much as possible for easy use and code developments by many physicists. For the total absorption type calorimeter, we applied the Frozen Shower Method, which reduces the CPU time significantly for high energy particles. The TOPAZ detector simulator reproduces the detector responses to the electromagnetic particles very well. (author).

31501 (KEK-PROC--91-14, pp. 14-24) **Design of TOPAZ masking system using EGS4.** Uno, Shoji (National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan)). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240--: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

There are two sources of the beam background in the e^+e^- collider experiments. One source is the synchrotron radiation from many magnets. Another source comes from the spent-electron hitting the beam pipe near the interaction region. To reduce the these background, TOPAZ masking system was designed using EGS4 code. The designed masking system consists of two pairs of masks which are called mask-1 and mask-2. The mask-1 is placed to intercept the spent-electron. The aperture of the mask-2 was determined for the synchrotron radiation photons not to hit the mask-1 directly. After these masks were installed, we are taking the data in the small beam background. (author).

31502 (KEK-PROC--91-14, pp. 34-38) **Design of the JLC positron source.** Ida, H. (NKK corp., Tokyo (Japan)); Uno, S.; Urakawa, J.; Kawabata, S.; Sumiyoshi, T.; Takeuchi, Y.; Miyamoto, A.; Yoshioka, M. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240--: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

A simulation program has been developed in order to design an intense positron source for the JLC. In this program, EGS4 code simulates positrons' positions and momenta at the exit of the target made of dense material. By using this program, design of the JLC positron source has been carried out in order to optimise positron yield. The results of the calculations are presented. (author).

31503 (KEK-PROC--91-14, pp. 104-112) **Calculations of LINAC spectrum characteristics using EGS4.** Sumitani, Hiroaki (Mitsubishi Electric Corp., Amagasaki, Hyogo (Japan). Central Research Lab.). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240--: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990).

In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

The 4 MeV, 6 MeV and 10 MeV LINAC spectra were calculated using EGS4 code. These spectra are wide band and maximum energies are same value of incident electrons energy. Using 4 MeV spectrum, I calculate the characteristics of the flattening filter. The beam hardening effect was observed. And I evaluated this 4 MeV LINAC whether it can apply CT (Computed Tomography) function. The linearity for the thickness and detector output is better for the spectrum using flattening filter. This result shows that 4 MeV LINAC may have a CT function. (author).

31504 (LAL-RT--91-09) **Numerical design of an rf-coupling iris.** Hanaki, H. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Jul 1991. 14p. Order Number DE92570119. Source: OSTI; NTIS (US Sales Only); INIS.

For an rf coupler of an rf system in high-quality transmission an analytical method may be applied to treat the design problem, if a coupling hole between cavities or waveguides is small enough. However, in most cases of accelerator engineering the dimensions of the coupling slots are not so small compared with the size of a cavity and a waveguide. Numerical design of rf coupling slots for a few cases is tried basically according to Henke's method using an equivalent circuit to treat the matching of microwave components, but taking account of beam loading expressed by the coupling coefficient β. The MAFIA code has been applied for the design. (R.P.) 5 refs., 10 figs., 3 tabs.

31505 (LAL-RT--91-10) **Analytical formulas for the resonant frequency changes due to opening apertures on cavity walls.** Gao, J. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Jun 1991. 17p. Order Number DE92570117. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nucl. Instrum. Methods Phys. Res., Sect. A (NL).

By introducing couplings between cavities and between cavity-waveguide, one can get different types of RF components such as linear accelerator structures, rf guns and klystrons etc. Based on the perturbation method, the resonant frequency changes due to apertures on a cavity wall have been investigated, and analytical formulas have been derived and compared with numerical and experimental results. The dispersion relation of a periodic disk-loaded slow wave structure, which relates the group velocity explicitly to the shapes and sizes of coupling apertures, is established and verified. These explicitly expressed analytical dispersion relations established in the paper will not only serve as useful tools in the design of forward (electrically coupled) and backward wave (magnetically coupled) linear accelerators, but also show a clear picture of relevant physical processes. (author) 13 refs., 14 figs., 1 tab.

31506 (LA-UR--92-2355) **Image processing and computer controls for video profile diagnostic system in the ground test accelerator** (GTA). Wright, R.M.; Zander, M.E.; Brown, S.K.; Sandoval, D.P.; Gilpatrick, J.D.; Gibson, H.E. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109--1: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92018988. Source: OSTI; NTIS; GPO Dep.

This paper describes the application of video image processing to beam profile measurements on the Ground Test Accelerator (GTA). A diagnostic was needed to measure beam profiles in the intermediate matching section (IMS) between the radio-frequency quadrupole (RFQ) and the drift tube linac (DTL). Beam profiles are measured by injecting puffs of gas into the beam. The light emitted from the beam-gas interaction is captured and processed by a video image processing system, generating the beam profile data. A general purpose, modular and flexible video image processing system, imagetool, was used for the GTA image profile measurement. The development of both software and hardware for imagetool and its integration with the GTA control system (GTACS) will be discussed. The software includes specialized algorithms for analyzing data and calibrating the system. The underlying design philosophy of imagetool was tested by the experience of building and using the system, pointing the way for future improvements. The current status of the system will be illustrated by samples of experimental data.

31507 (LA-UR--92-2420) **Real-time data archiving for GTA.** Cole, R.A.; Atkins, W.H. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109--2: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92018613. Source: OSTI; NTIS; GPO Dep.

The architecture of the GTA control system, the nature of a typical GTA commissioning activity, and the varied interests of those analyzing the data make it challenging to develop a general-purpose scheme for archiving data and making the data available to those who will use it. Addressing the needs of those who develop and trouble-shoot hardware and software increases the challenge. This paper describes the aspects of GTA that affect archiving operations and discusses how the features of the EPICS archiving module meet a variety of needs for storing and accessing data.

31508 (LA-UR--92-2422) **A distributed timing system for synchronizing control and data correlation.** Stettler, M.; Thout, M.; Dalesio, L.R.; Cole, R.; Fite, C.; Slentz, G.; Warren, D. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109--3: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92018603. Source: OSTI; NTIS; INIS; GPO Dep.

Synchronization is necessary in experimental physics machines to provide positive control over related events. The Ground Test Accelerator (GTA) timing system provides this function through a distributed control system, known as the Experimental Physics and Industrial Control System (EPICS). The EPICS timing system was designed to take advantage of a distributed architecture, and provides time stamping for synchronous data correlation as well as event control. The system has been successfully demonstrated on over a dozen controller nodes for operation and data analysis. The design of the hardware, software, and operational results are discussed.

31509 (LA-UR--92-2553) **Suppression of the e^- coextracted from a Penning surface-plasma H^- source.** Smith, H.V. Jr.; Allison, P. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109--9: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040350. Source: OSTI; NTIS; INIS; GPO Dep.

The ratio of electrons to negative ions extracted from Penning surface-plasma sources (SPS) such as the 8X source is low even before any steps are taken to suppress the electrons. For the 8X source the e^-/H^- ratio is typically four or five to one for H^- operation and nine to one for D^- operation. Because the coextracted e^- present a power-loading problem to the 8X source extraction system, methods to dissipate and/or reduce the power in the e^- beam must be developed before extracting a dc H^- or D^- beam. Thus, an experiment was run to see if a collar installed in the near extraction region of the 8X source suppresses the electrons extracted from that source.

31510 (LA-UR--92-2666) **Log-ratio beam position monitoring at 425 MHz.** Wells, F.D.; Shafer, R.E.; Gilpatrick, J.D. Los Alamos National Lab., NM (United States). [1992]. 3p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109--5: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040250. Source: OSTI; NTIS; GPO Dep.

A logarithmic-ratio beam position monitoring circuit has been designed, based on a monolithic logarithmic-amplifier integrated circuit that provides 70 dB of gain over the 100-MHz to 500-MHz frequency range. Log-ratio circuits previously reported operate at frequencies below 100 MHz [1, 2, 3]. Operation at higher accelerator bunching frequencies previously required down-conversion to an intermediate frequency in the 20 to 100 MHz range. This new circuit offers the possibility of position measurement without down conversion.

31511 (LA-UR--92-2692) **Electron-beam diagnostics development for the Los Alamos FEL facility.** Wilke, M.D. (Los

Alamos National Lab., NM (United States)); O'Shea, P.G.; Pitcher, E.J.; Feldman, R.B.; Lumpkin, A.H. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109–11: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040245. Source: OSTI; NTIS; INIS; GPO Dep.

We describe some electron-beam diagnostics and results from the Los Alamos APLE Prototype Experiment (APEX) linac. The diagnostics include complementary nonintercepting and intercepting techniques with time integrated and time resolved capabilities.

31512 (LA-UR–92-2703) **Commissioning of the Ground Test Accelerator RFQ.** Johnson, K.F.; Sander, O.R.; Atkins, W.H.; Bolme, G.O.; Brown, S.; Connolly, R.; Garnett, R.; Gilpatrick, J.D.; Guy, F.W.; Ingalls, W.B.; Little, C.; Lohson, R.A.; Lloyd, S.; Neuschaefer, G.; Power, J.; Saadatmand, K.; Sandoval, D.P.; Stevens, R.R.; VaughnLos Alamos National Lab., NM (United States). [1992]. 3p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109–14: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040242. Source: OSTI; NTIS; INIS; GPO Dep.

The Ground Test Accelerator (GTA) has the objective of verifying much of the technology (physics and engineering) required for producing high-brightness, high-current H^- beams. GTA commissioning is staged to verify the beam dynamics design of each major accelerator component as it is brought on-line. The commissioning stages are the 35 kev H^- injector, the 2.5 MeV Radio Frequency Quadrupole (RFQ), the Intertank Matching Section (IMS), the 3.2 MeV first $2\beta\gamma$ Drift Tube Linac (DTL-1) module, the 8.7 MeV $2\beta\gamma$ DTL (modules 1–5), and the 24 MeV GTA; all 10 DTL modules. Commissioning results from the RFQ beam experiments will be presented along with comparisons to simulations.

31513 (LA-UR–92-2704) **Commissioning of the Ground Test Accelerator Intertank Matching Section.** Johnson, K.F.; Sander, O.R.; Atkins, W.H.; Bolme, G.O.; Cole, R.; Connolly, R.; Gilpatrick, J.D.; Ingalls, W.B.; Kersteins, D.; Little, C.; Lohsen, R.A.; Lysenko, W.P.; Mottershead, C.T.; Power, J.; Rusthoi, D.P.; Sandoval, D.P.; Stevens, R.R.; Vaughn, G.;Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109–13: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040241. Source: OSTI; NTIS; INIS; GPO Dep.

The Ground Test Accelerator (GTA) has the objective of verifying much of the technology (physics and engineering) required for producing high-brightness, high-current H^- beams. GTA commissioning is staged to verify the beam dynamics design of each major accelerator component as it is brought on-line. The commissioning stages are the 35 keV H^- injector, the 2.5 MeV Radio Frequency Quadrupole (RFQ), the Intertank Matching Section (IMS), the 3.2 MeV first $2\beta\gamma$ Drift Tube Linac (DTL-1) module, the 8.7 MeV $2\beta\gamma$ DTL (modules 1–5), and the 24 MeV GTA; all 10 DTL modules. Commissioning results from the IMS beam experiments will be presented.

31514 (LA-UR–92-2705) **Rf system specifications for a linear accelerator.** Young, A.; Eaton, L.E. Los Alamos National Lab., NM (United States). [1992]. 3p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109–10: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040240. Source: OSTI; NTIS; INIS; GPO Dep.

A linear accelerator contains many systems; however, the most complex and costly is the RF system. The goal of an RF system is usually simply stated as maintaining the phase and amplitude of the RF signal within a given tolerance to accelerate the charged particle beam. An RF system that drives a linear accelerator needs a complete system specification, which should contain specifications for all the subsystems (i.e., high-power RF, low-level RF, RF generation/distribution, and automation control). This paper defines a format for the specifications of these subsystems and discusses each RF subsystem independently to provide a comprehensive understanding of the function of each subsystem. This paper concludes with an example of a specification spreadsheet allowing one to input the specifications of a subsystem. Thus, some fundamental parameters (i.e., the cost and size) of the RF system can be determined.

31515 (LA-UR–92-2706) **Rf system description for the ground test accelerator radio-frequency quadrupole.** Regan, A.H.; Brittain, D.; Rees, D.E.; Ziomek, D. Los Alamos National Lab., NM (United States). [1992]. 8p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208109–12: 16. international LINAC conference, Ottawa (Canada), 23-28 Aug 1992). Order Number DE92040239. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes the RF system being used to provide RF power and to control the cavity field used for the ground test accelerator (GTA) radio-frequency quadrupole (RFQ). The RF system consists of a low-level RF (LLRF) control system that uses a tetrode as a high-power amplifier (HPA) as part of its plant to deliver up to 300 kW of peak power to the RFQ at a 2% duty factor. The LLRF control system implements in-phase and quadrature (I&Q) control to maintain the cavity field within tolerances of 0.5% in amplitude and 0.5° in phase in the presence of beam-induced instabilities. This paper describes the identified components and presents measured performance data. The user interface with the systems is described, and cavity field measurements are included.

31516 (LBL–31041) **Using a straightness reference in obtaining more accurate surface profiles from a Long Trace Profiler.** Irick, S.C. (Lawrence Berkeley Lab., CA (United States)); McKinney, W.R.; Lunt, D.L.J.; Takacs, P.Z. Lawrence Berkeley Lab., CA (United States). 15 Jul 1991. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-910730–32: 4. international conference on synchrotron radiation instrumentation, Chester (United Kingdom), 15-19 Jul 1991). Order Number DE92016995. Source: OSTI; NTIS; GPO Dep.

The Long Trace Profiler has found significant applications in measuring the surfaces of synchrotron optics. However, requirements of small slope errors at all spatial wavelengths of the synchrotron optics mandate more accurate slope measurements. A straightness reference for the Long Trace Profiler greatly increases the accuracy of the instrument. Methods of using the straightness reference by interpreting the sequential interference patterns are discussed and results of measurements are presented.

31517 (NIIEFA-P-V–0846) **Calculation of accelerating voltage shaping circuits by the gradient-ravine method.** Miroshnichesnko, A.L. Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (Russian Federation). 1990. 9p. (In Russian). Order Number DE92644315. Source: OSTI; NTIS (US Sales Only); INIS.

The gradient-ravine optimization methods for calculating the accelerating voltage shaping circuits, are described. The program algorithms and results of numerical simulation, are presented. It is shown that such an approach is efficient for determining pulse voltage generator parameters. 9 refs.; 5 figs.

31518 (NIIEFA-P-V–0847) **Variational characteristics of ion injector for a linear accelerator.** Grigorenko, S.V.; Zuev, Yu.V.; Svistunov, Yu.A.; Strokach, A.P. Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (Russian Federation). 1990. 13p. (In Russian). Order Number DE92644310. Source: OSTI; NTIS (US Sales Only); INIS.

Results of numerical simulation of high phase density beam dynamics in an ion injector, are presented. The investigation is conducted using a concrete example of negative hydrogen ion injector with plasma-surface source for ion accelerator with 150 MHz operating frequency. Effect of bending magnet and accelerating-focusing system electrode (parameter change) on the shape and value of the beam phase volume at the inlet to accelerator, is considered. 8 refs.; 7 figs.; 2 tabs.

31519 (NIKHEF-H–92-03) **Mechanical behaviour of a closed collar model for an 11.5 T dipole magnet.** Emden, W. van (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H); Daum, C.; Geerinck, J.;

Ouden, A. den; Kate, H.H.J. ten; Avest, D. ter; Wessel, S.; Dubbeldam, R. Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H. Mar 1992. 19p. (LHC-Note–181.). Order Number DE93602017. Source: OSTI; NTIS; INIS.

LHC-note 181.

A 10 cm long model of an 11.5 T Nb_3Sn accelerator dipole magnet, which will be built in the Netherlands, with a closed ring shaped collar has been constructed. Measurements of the collar deformation and the prestress at the poles have been made with a structural analysis using the Finite Element Method (FEM) of the code ANSYS. (author). 11 refs.; 18 figs.; 7 tabs.

31520 (NIKHEF-K-AmPS–91-08) **Injecting into AmPS when ring cavity operates at 476 MHz.** Maas, R. Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie K. Dec 1991. 10p. Order Number DE93602020. Source: OSTI; NTIS; INIS.

The RF requirements for the two modes of AmPS, Stretcher Mode and Storage Mode, are different. In Storage Mode, as is shown in this report, it is more practical to operate at a lower RF-frequency than f_{RF}=2856MHz, which is the RF-frequency in Stretcher Mode. A few consequences of operating the ring cavity at a lower frequency than the (injecting) linac frequency will be reviewed. (author). 1 ref.; 4 figs.

31521 (RCNP-T–29) **Proceedings of the RCNP cascade project workshop 'heavy ion secondary beam course'.** Osaka Univ., Ibaraki (Japan). Research Center for Nuclear Physics. Oct 1991. 173p. (In Japanese). (CONF-9012153–: RCNP cascade project workshop 'heavy ion secondary beam course'; RCNP cascade project workshop 'heavy ion secondary beam course', Ibaraki (Japan); IBARAKI (is not a valid Country Code.), 15 Dec 1990; 26 jan 1991; CONF-9101148–). Order Number DE93704288. Source: OSTI; NTIS; INIS.

In the Research Center for Nuclear Physics (RCNP), Osaka University, as one of the experimental facilities utilizing the heavy ion beam from the ring cyclotron, the construction of the heavy ion secondary beam course has been in progress. This course can supply the unstable nuclei produced by a heavy ion reaction as a secondary beam, and is expected to become the powerful experimental facility for elucidating the condition of atomic nuclei in the extreme condition and their reaction mode. At present, the arrangement is advanced aiming at the utilization from the end of fiscal year 1991. Toward the start of joint utilization experiment, in order to examine the expected physics, concrete experimental plan and the preparation plan accompanying them, the workshop including the introduction of the course was held. On December 15, 1990, the workshop with the theme on the nuclear reaction by unstable nucleus beam was held, and on January 26, 1991, that with the theme on the spectroscopy of unstable nuclei was held. In each meeting, there were more than 20 participants. In this report, the gists of 18 papers are collected. (K.I.).

31522 (SLAC-PUB–5800) **Optimizing the injection straight of PEP II asymmetric B Factory at SLAC.** Bulos, F. (Stanford Linear Accelerator Center, Menlo Park, CA (United States)); Bloom, E.; Davies-White, W.; Donald, M.; Fairfield, K.; Fieguth, T.; Godfrey, G.; Holtzapple, R.; Hutton, A.; Loew, G.; Miller, R.; Sukiennicki, B.; Wen, H.; Ronan, M. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Apr 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (LBL–32726;CONF-9204126–5: B factories: state of the art in accelerators, detectors, and physics, Stanford, CA (United States), 6-10 Apr 1992). Order Number DE92019646. Source: OSTI; NTIS; INIS; GPO Dep.

The asymmetric energy PEP II B Factory proposed as an upgrade of PEP at the Stanford Linear Accelerator Center requires both a powerful low emittance source of e^-e^+ and a very reliable and efficient injection system. The SLC linac fulfills the source requirement very well. We describe here the optimization of the optics of the injection straight to insure reliable and efficient injection.

31523 (SLAC-PUB–5822) **Mechanical equipment for magnet measurement and alignment.** Harvey, A. Stanford Linear Accelerator Center, Menlo Park, CA (United States). May 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9203101–2: CERN accelerator school on magnetic measurement and alignment, Montreux (Switzerland), 16-20 Mar 1992). Order Number DE92040945. Source: OSTI; NTIS; INIS; GPO Dep.

The mechanical equipment for measuring and aligning (or fiducializing) magnets is described by reference to devices designed and built by a number of laboratories. Some of these are now available commercially. The descriptions are supplemented by a list of representative sources of hardware.

31524 (SLAC-PUB–5848) **Polarized electron sources for linear colliders.** Clendenin, J.E.; Ecklund, S.D.; Miller, R.H.; Schultz, D.C.; Sheppard, J.C. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-920706–23: 15. international conference on high energy accelerators, Hamburg (Germany), 20-24 Jul 1992). Order Number DE92019649. Source: OSTI; NTIS; INIS; GPO Dep.

Linear colliders require high peak current beams with low duty factors. Several methods to produce polarized e^- beams for accelerators have been developed. The SLC, the first linear collider, utilizes a photocathode gun with a GaAs cathode. Although photocathode sources are probably the only practical alternative for the next generation of linear colliders, several problems remain to be solved, including high voltage breakdown which poisons the cathode, charge limitations that are associated with the condition of the semiconductor cathode, and a relatively low polarization of $\lesssim$5O%. Methods to solve or at least greatly reduce the impact of each of these problems are at hand.

31525 (SLAC-PUB–5862) **3-dimensional bundle adjustments in industrial metrology: A comparison.** Gaydosh, M.; LeCocq, C.; Ruland, R.; Wand, B. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1992. 100p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-920892–3: 1992 American Society for Photogrammetry and Remote Sensing/American Congress on Surveying and Mapping/Resource Technology (ASPRS/ACSM/RT) convention on monitoring and mapping global change, Washington, DC (United States), 3-8 Aug 1992). Order Number DE92019093. Source: OSTI; NTIS; INIS; GPO Dep.

Several theodolite measurement systems are available for use in the industrial metrology market. Many of them offer a rigorous 3-dimensional bundle adjustment routine. In this paper several systems in use and available for evaluation purposes at the Stanford Linear Accelerator Center will be tested and their results compared.

31526 (SLAC-PUB–5863) **SLAC modulator operation and reliability in the SLC Era.** Donaldson, A.R.; Ashton, J.R. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jun 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-920671–10: 20. international power modulator symposium, Myrtle Beach, SC (United States), 23-25 Jun 1992). Order Number DE92019650. Source: OSTI; NTIS; INIS; GPO Dep.

A discussion of the operation and reliability of the 244 modulators in the SLAC linac with an emphasis on the past three years of operation. The linac modulators were designed and built in the 60's, upgraded for the SLAC Linear Collider (SLC) in the mid 80s, and despite their age are still reliable accelerator components. The 60s modulator operated at 65 MW peak and 83 kW average power. The upgrade resulted in 150 MW peak output at an average power of 87 kW, a modest increase since the repetition rate was dropped from 360 to 120 Hz. In the present accelerator configuration, the Linac operates as a source of electrons and positrons to a single pass coillider. The classic collider is a storage ring filled with oppositely charged, counter-rotating particles which are allowed to collide until an accelerator fault occurs and the stored beams are aborted. A reasonable storage ring can store and collide particles for as long as eight hours with a 10 or 20 minute filling time. A single pass collider, + on the other hand, can only produce e^- and e^+ collisions at whatever rate the source operates. To be effective the SLC must operate at 120 Hz with a very high degree of reliability and on a continuous basis. Fortunately, the linac has a modest excess of modulator/klystron systems which allows some measure of redundancy and hence some freedom from the constraint that all 244 modulator/klystrons operate simultaneously. Nonetheless, high importance is placed on modulator MTBF and MTRR or, in the parlance of reliability experts and accelerator physicists, availability. This is especially true of the modulators associated with the fundamental requirements of a collider such as injection, compression and positron production.

31527 (SSCL–576) **Fully pipelined and programmable Level 1 trigger.** Crosetto, D.; Love, L. Superconducting Super Collider Lab., Dallas, TX (United States). Jul 1992. 65p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. Order Number DE92019800. Source: OSTI; NTIS; INIS; GPO Dep.

The types of detectors and the physics involved in present experiments are reaching a level of cost and complexity so great that it is preferable to implement a programmable trigger solution at all levels rather than a system realized with cabled logic. Experience demonstrates that the fine tuning on the trigger is often only achieved after running an experiment and analyzing the first data acquired. Recent advances in technology made real-time programmable algorithms down to the Level I trigger feasible. In this report a number of algorithms for the first level trigger have been simulated using one of the most advanced chips available. A fully-pipelined and programmable Level 1 trigger system sustaining a clock rate of 16 ns has been designed based on a modified version of the DataWave chip.

31528 (SSCL–583) **ASST Interconnect Region single phase pressure tests.** Mendoza, R. Superconducting Super Collider Lab., Dallas, TX (United States). Aug 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC35-89ER40486. Order Number DE92041228. Source: OSTI; NTIS; INIS; GPO Dep.

The Accelerator System String Test (ASST) single phase line was pressure tested to meet ASME B31.3-1990 piping code requirements. Two test specimens, one without a bellows assembly and one with a bellows assembly, were tested under hydrostatic pressure in 0.689 MPa (100psi) increments. All parts met code requirements except the bellows squirm protector, which met ASST-rated pressure levels but not Collider-rated levels, due to inadequate tab weld quality. Extra support such as hose clamps and possible minor redesign would allow the squirm protector to meet ASME code requirements for the Collider.

4304 Storage Rings

Refer also to citation(s) 31522, 31598, 32147, 32171

31529 (BNL–47803) **Scaling of gain with energy spread and energy in the PEP FEL.** Fisher, A.S. Brookhaven National Lab., Upton, NY (United States). 13 Jul 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CAP–85-92R). Order Number DE92019248. Source: OSTI; NTIS; INIS; GPO Dep.

The Sag Harbor paper on the PEP FEL discusses the scaling of various FEL parameters with energy spread σ_ε. I will repeat some of this material here and then examine the benefit of increasing the energy spread. How much energy spread can be achieved with damping wigglers is the next topic. Finally, I consider the dependence of gain and saturation length on beam energy and undulator field.

31530 (IPNO–1990/1, pp. 85-93) **Jet targets on electron rings the Argon cluster-beam in ADONE.** Anghinolfi, M. (Istituto Nazionale di Fisica Nucleare, Genoa (Italy)); Corvisiero, P.; Mattera, L.; Ricco, G.; Sanzone, M.; Taiuti, M.; Valbusa, U.; Zucchiatti, A.; Bianchi, N.; Sanctis, E. De; Guaraldo, C.; Sandri, P.L.; Lucherini, V.; Muccifora, V.; PoliParis-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The Argon cluster-beam, with maximum thickness of 1.5x10^{14} atoms/cm^2, installed at Frascati on the ADONE storage ring, is described. The cluster-beam works at room temperature and is used as a radiator to produce an intense tagged photon beam with energy up to 1.2 GeV. The Argon beam properties were measured using electrons stored in ADONE. The results are in good agreement with the expected values. The effects of the target on the circulating electrons were studied. The apparatus can produce cluster-beams of higher thickness and work with different gases. It is suitable for internal target experiments with the 1.5 GeV stored electrons. (author) 23 refs., 5 figs., 1 tab.

31531 (JINR-D–1-91-96) **On the check-up of the violation of the relativity principle by the investigation of the local properties of spin precession of relativistic electrons conducted at the storage ring.** Neganov, B.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1991. 24p. (In Russian). Order Number DE92644326. Source: OSTI; NTIS (US Sales Only); INIS.

Lorentz's concept of physical vacuum, existence of priviliged reference frame related to violation of group properties of general Lorentz's transformations without rotation, and a possibility of setting up an experiment to detect violation of the principle of relativity due to Thomas spin precession of relativistic electrons are discussed. Specific variants of the experiment and methods of observation are considered, the necessary parameters of the device are estimated. 9 refs.; 3 figs.

31532 (JINR-E–9-91-51) **Linear synchro-betatron resonances, driven by beam-beam interaction.** Tsenov, S.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 15p. Order Number DE92644329. Source: OSTI; NTIS (US Sales Only); INIS.

The combined action of a linear synchro-betatron resonance, due to a nonzero dispersion at the interaction point of a colliding beam device and a standard beam-beam parametric resonance has been analyzed. The synchro-betatron resonance has been studied involving the single resonance model. The projected emittance on the horizontal phase subspace has been calculated. 7 refs.

31533 (JINR-E–9-91-178) **JINR Tau-charm factory design considerations.** Aleksandrov, V.S. (and others); Antropov, V.K.; Arkhipov, O.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 11p. Order Number DE92644327. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to IEEE 1991 Particle Accelerators Conference, San-Francisco, California, 6-9 May, 1991.

Some results of the JINR tau-charm conceptual study is given. The general considerations on the storage ring and accelerator complex in JINR, the tau-charm factory injector system and the main ring, the principles and the parameter estimations to achieve high luminosity are regarded. 8 refs.; 5 figs.; 2 tabs.

31534 (JINR-E–9-91-293) **Dissipative particle dynamics in ee-bar storage rings in the presence of linear synchro-betatron coupling.** Tsenov, S.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 18p. Order Number DE92644328. Source: OSTI; NTIS (US Sales Only); INIS.

The effect of synchrotron radiation on particle dynamics in ee-bar storage rings in the presence of linear synchro-betatron coupling has been investigated. A systematic method for adiabatic elimination of angle variables, using the projection operator technique has been presented. AN expression for the horizontal beam lifetime has been derived. 10 refs.; 1 fig.

31535 (JINR-R–9-90-548) **Simulation of one-turn system of initial betatron beam oscillations for UNK I stage.** Zhabitskij, V.M.; Ignatova, L.G.; Ivanov, I.N.; Malakhov, N.A.; Mamonov, V.N.; Mel'nikov, V.A.; Pilar, N.V.; Shcheulov, A.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 6p. (In Russian). Order Number DE92644330. Source: OSTI; NTIS (US Sales Only); INIS.

A system is proposed for the UNK I stage to provide the one-turn damping of initial betatron beam oscillations due to the injection errors. A necessity of the one-turn damping regime is connected with a considerable increment of the transverse beam instability. The experiments have shown that the proposed scheme allows to form in the kicker magnet/inductance is 2μH. The current pulse with a required accuracy /+-3%/up to 500 A with the flat-top duration 4.85 μs and the edge 0.5μs. 5 refs.; 5 figs.

31536 (JINR-R–9-91-99) **Damping of resistive instability in UNK-1 with digital electronics in feedback.** Zhabitskij, V.M. (Joint Inst. for Nuclear Research, Dubna (USSR)); Ivanov, I.N.; Korenev, I.L.; Yudin, L.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1991. 12p. (In Russian). Order Number DE92644331. Source: OSTI; NTIS (US Sales Only); INIS.

The basis of resistive instability damper system for the UNK-1 is obtained. The system for each of two directions of beam transverse oscillations includes two pairs of pick-up electrodes and damping kickers connected by delayed negative feedback with digital electronics. The requirements for digital electronics in feedback are discussed. The influence of a notch filter is under consideration. In turns out that a 0.8 MHz feedback system damps the resistive instability in the UNK-1 with increment of 0.7 revolution frequency (for low frequencies). 7 refs.; 8 figs.

31537 (KEK-PROC–91-2(v.2), pp. 431-442) **Beam diagnostic instruments of TARN II.** Watanabe, Shin-ichi (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Nov 1991. (CONF-9104225–: Workshop on advanced beam instrumentation, Tsukuba (Japan), 20-28 Apr 1991). In *Proceedings of the workshop on advanced beam instrumentation.* 101p. Order Number DE92789023. Source: OSTI; NTIS; INIS.

The beam diagnostic instruments of the heavy ion synchrotron cooler TARN II are described. The test accumulation ring, TARN, had been constructed for the development of heavy ion accumulation, and the experiments of beam acceleration and stochastic cooling were performed successfully. TARN was converted into a new ring, TARN II, which has a maximum energy of 1.1 GeV and 370 MeV/amu for protons and heavy ions. The beam diagnostic system was constructed for a beam intensity of less than 1^*10^6 charges. With the system, position, profiles, bunch structure, intensity, emittance and momentum spread were measured to evaluate the injection, accumulation, acceleration and cooling experiments. (author).

31538 (KEK-PROC–91-14, pp. 25-33) **A simulation study on KEK positron generator.** Kamitani, Takuya (National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan)); Asami, Akira; Sato, Isamu; Enomoto, Atsushi; Ohsawa, Satoshi; Oogoe, Takao; Kakihara, Kazuhisa; Yokota, Mitsuhiro. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240–: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

KEK positron generator was upgraded last year by improving the solenoid focus system and the beam transport system consisting of quadrupole magnets. A simulation study on positron generation in the target and focussing by the solenoid have been performed to explain the beam profile measured after the upgrade. Details of the simulation is described here. (author).

44 INSTRUMENTATION

Refer also to citation(s) 30934, 30935

4401 Radiation Instrumentation

Refer also to citation(s) 30615, 30617, 30708, 30765, 30773, 31444, 31471, 31496, 31500, 31644, 31651, 31700, 31718, 31748, 32068, 32069, 32135, 32249, 32342, 32348, 32473

31539 (ANL/CP–76585) **Characterization of ^{3}He area sensitive proportional counters at IPNS for SANS applications.** Thiyagaragjan, P. (Argonne National Lab., IL (United States)); Crawford, R.K.; Epperson, J.E.; Wozniak, D.G.; Carpenter, J.M.; Bradley, K.F. Argonne National Lab., IL (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920792–22: SPIE international symposium on optical applied science and engineering, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92019041. Source: OSTI; NTIS; INIS; GPO Dep.

The Small Angle Diffractometer (SAD) at the Intense Pulsed Neutron Source (IPNS) utilizes a 20 × 20 cm^2 Borkowski-Kopp type ^{3}He position sensitive detector (PSD) which has reliably performed small-angle neutron scattering experiments for more than a decade. The pulsed-source based SAD employs a small, but fixed, sample-to-detector distance and a pulsed polychromatic neutron beam. The neutron energies are resolved through time-of-flight (TOF) measurements so that a much wider range of momentum transfer is probed in a single measurement compared to the range of spectrometers using monochromatic incident beams. However, the pulsed source requires a short sample-to-detector distance so that the detector covers a large solid angle, but with lower angular resolution, and this situation puts stringent demands on the spatial resolution of the detector. Previously, nonlinearities in the position encoding of detected neutrons required that the outer channels of the detector, representing 40% of the detector area, be discarded. This paper presents a technique to characterize both the position encoding and the position resolution of the entire detector so that the whole detector can be used for SANS measurements.

31540 (ANL/CP–76648) **The Argonne silicon strip-detector array.** Wuosmaa, A.H. (Argonne National Lab., IL (United States)); Back, B.B.; Betts, R.R.; Freer, M.; Gehring, J.; Glagola, Happ, T.; Henderson, D.J.; Wilt, P.; Bearden, I.G. Argonne National Lab., IL (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9205108–11: International conference on nuclear structure at high angular momentum, Ottawa (Canada), 18-21 May 1992). Order Number DE92018185. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. SI SEMICONDUCTOR DETECTORS/operation; SI SEMICONDUCTOR DETECTORS/design; OPERATION; DESIGN; ALPHA PARTICLES; INELASTIC SCATTERING; CARBON 12 TARGET; CARBON 12 REACTIONS; ANL; CAMAC SYSTEM

31541 (ANL-HEP-CP–92-46) **[Effects of ionizing radiation on scintillators and other particle detectors]: Conference summary.** Proudfoot, J. Argonne National Lab., IL (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9204138–Summ.: International conference of radiation-tolerant scintillators and detectors, Tallahassee, FL (United States), 28 Apr - 2 may 1992). Order Number DE92018184. Source: OSTI; NTIS; INIS; GPO Dep.

It is my task to summarise the great variety of topics (covering a refreshing mix of physics, chemistry and technology) presented at this conference, which has focused on the effects of ionising radiation on scintillators and other particle detectors. One of the reasons and the central interest of many of the participants was the use of such detectors in experiments at two future large hadron colliders: the Superconducting Super Collider to be operating outside of Dallas in the United States by the turn of the decade and its European counterpart the Large Hadron Collider to be operating outside of Geneva in Switzerland on a similar time scale. These accelerators are the "apple of the high energy physicist's eye." Their goal is to uncover the elusive Higgs particle and thereby set the cornerstone in our current knowledge of elementary particle interactions. This is the Quest, and from this lofty height the presentations rapidly moved on to the specific questions of experimental science: how such an experiment is carried out; why radiation damage is an issue; how radiation damage affects detectors; which factors affect radiation damage characteristics; which factors are not affected by radiation damage; and how better detectors may be constructed. These were the substance of this conference.

31542 (BNL–47776) **Radiation damage in cesium iodide and other scintillating crystals.** Woody, C. Brookhaven National Lab., Upton, NY (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9204126–4: B factories: state of the art in accelerators, detectors, and physics, Stanford, CA (United States), 6-10 Apr 1992). Order Number DE92019255. Source: OSTI; NTIS; INIS; GPO Dep.

Radiation damage in scintillating crystals is discussed in terms of how it can affect the performance of crystals used in a high resolution electromagnetic calorimeter. An attempt is made to identify certain principle causes of damage and describe how these may affect various parameters such as light output, energy resolution and noise. A discussion of radiation damage in barium fluoride is given as an example of how these effects can be understood and how the radiation hardness of a given crystal can be improved. Radiation damage in doped and undoped cesium iodide is compared in order to distinguish between damage occurring in the undoped material and those which could be caused by dopants such as sodium or thallium. New results on radiation damage in both doped and undoped CsI are also discussed.

31543 (CEAC-R--5-91) **Geologichal effectiveness of nuclear trace method in uranium prospecting.** Gonzalez Mateu, D. (Centro de Estudios Aplicados al Desarrollo Nuclear (CEADEN), La Habana (Cuba)); Cervantes, P. Comision de Energia Atomica, La Habana (Cuba). 1991 11p. (In Spanish). Order Number DE93602304. Source: OSTI; NTIS (US Sales Only); INIS.

The results obtained by the track-etch technique in the Uranium prospection, and those obtained using other radiometrical methods, were compared. The Uranium mineralization in the selected test field lye in the 100m depth. A good geological efficacy of the track-etch technique was established.

31544 (CNIC--00385) **The research on the measuring method and equipment of fast neutron absorption dosimetry and international intercomparison.** Zheng Jinmei (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Rong Chaofan; Yang Xiaoyun. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 18p. (In Chinese). (IAE--0073.). Order Number DE93602173. Source: OSTI; NTIS (US Sales Only); INIS.

The double dosimeter method for neutron dosimetry is introduced. The neutron and gamma tissue kinetic energy released in matter (KERMA) K_N and K_G in the free air of (d+T) neutron field at Institute of Atomic Energy, Beijing (IAEB) were determined. The uncertainty of K_N is 4.37%. The difference of K_N measured by this method and by the conversion of neutron fluence determined by the associated particle method is less than 1.0%. This device has been used for international intercomparison of neutron dosimetry organized by Bureau International des Poids et Mesures (BIPM). The results are also given.

31545 (CNIC--00422) **Data acquisition and processing system for coincidence measurements.** Li Xu (Beijing Nuclear Instrument Factory, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China). Jul 1990. 13p. (In Chinese). (BNIF--0003.). Order Number DE93602151. Source: OSTI; NTIS (US Sales Only); INIS.

An instrument has been designed for the absolute measurement of radioactivity with $4\pi\beta$(PC)-γ coincidence. The instrument can be used as a standard device for the radioactivity measurement in metrology laboratories. Also it can be used in the nuclear science and engineering research for absolute measurement of nuclear decay rate. The control of the system dead time and coincidence resolving time is digitized. The precision can reach ±2 ns. For data acquisition and communication the normalizing GPIB interface system technique is adopted. The measuring error caused by this instrument itself can be better than ±0.02%.

31546 (CNIC--00465) **Study on the focal-plane detector system for medium heavy ions.** Wan Yude (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); li Zhongzhen. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 10p. (In Chinese). (IAE--0087.). Order Number DE93602223. Source: OSTI; NTIS (US Sales Only); INIS.

A medium heavy ion focal-plane detector system (500mm long) was tested with beam and has been used in nuclear physics experiment. The detector telescope consists of five rectangular proportional counters. The operating gas is 30% CH_4 + 70% Ar. In a table experiment, the intrinsic resolution of the position sensitive detector is about 0.7mm (FWHM), the integral nonlinearity is better than 0.2%. In a test experiment at cyclotron, the energy resolution of the Δ E detector is about 6.3%, the energy resolution of the E detector is about 10%. The measured results at tandem accelerator with 60 MeV ^{12}C beam for the pressure of 0.5×10^5 Pa are: the intrinsic resolution of the position sensitive detector is about 1.3mm, the integral nonlinearity is better than 0.62%; the energy resolution of the Δ E detector is about 6%; the energy resolution of the E detector is about 31%.

31547 (CRN-HE--91-06) **A fast position sensitive photodetector based on a CsI reflective photocathode.** Arnold, R.; Christophel, E.; Guyonnet, J.L. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1991. 37p. Order Number DE92570098. Source: OSTI; NTIS (US Sales Only); INIS.

A fast detector was built for UV photon detection that depends on a CsI sensitized pad cathode. The rapidity of the detector is compared with that of a more classical chamber filled with photosensitive gases such as TEA or TMAE. Estimates of the quantum yield of the photocathode at 160 and 200 nm are given. The performances obtained make it a good photodetector candidate to be operated at high luminosity accelerators. (author) 7 refs., 19 figs.

31548 (CRN-HE--91-07) **Development of high resolution double-sided silicon detectors with projective readout.** Turchetta, R. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires; Strasbourg-1 Univ., 67 (France). Apr 1991. 206p. (In French). Order Number DE93701127. Source: OSTI; NTIS (US Sales Only); INIS.

A new kind of double-sided AC-coupled silicon microstrips detectors has been developed. Ohmic separation is obtained by means of a field shaping. Experimental measurements as well as device simulations show the effectiveness of this insulation scheme. A 50 microns pitch prototype has been tested in a high-energy beam. A telescope of single-sided AC-coupled silicon microstrips detectors has been used for the precise spatial reconstruction of tracks. Spatial resolution on both sides of the double-sided microstrips detector is about 10 microns. A Monte Carlo simulation based on a charge division model in microstrip detectors has been developed. It reproduces the beam test results, and allows to predict the performances of single-, as well as double-sided, microstrips detectors. Following these results, the DELPHI collaboration at LEP is going to install two layers of these new double-sided microstrips detectors, in order to get a very precise spatial reconstruction of charged particle tracks, produced by high-energy electron-positron collisions.

31549 (DOE/ER/40697--1) **[Calorimeter based detectors for high energy hadron colliders]: [Progress report].** State Univ. of New York, Albany, NY (United States). Research Foundation. 4 Aug 1992. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-92ER40697. Order Number DE92019240. Source: OSTI; NTIS; INIS; GPO Dep.

This document provides a progress report on research that has been conducted under DOE Grant DEFG0292ER40697 for the past year, and describes proposed work for the second year of this 8 year grant starting November 15, 1992. Personnel supported by the contract include 4 faculty, 1 research faculty, 4 postdocs, and 9 graduate students. The work under this grant has in the past been directed in two complementary directions -- DO at Fermilab, and the second SSC detector GEM. A major effort has been towards the construction and commissioning of the new Fermilab Collider detector DO, including design, construction, testing, the commissioning of the central tracking and the central calorimeters. The first DO run is now underway, with data taking and analysis of the first events. Trigger algorithms, data acquisition, calibration of tracking and calorimetry, data scanning and analysis, and planning for future upgrades of the DO detector with the advent of the FNAL Main Injector are all involved. The other effort supported by this grant has been towards the design of GEM, a large and general-purpose SSC detector with special emphasis on accurate muon measurement over a large solid angle. This effort will culminate this year in the presentation to the SSC laboratory of the GEM Technical Design Report. Contributions are being made to the detector design, coordination, and physics simulation studies with special emphasis on muon final states. Collaboration with the RD5 group at CERN to study muon punch through and to test cathode strip chamber prototypes was begun.

31550 (ECN-C--91-076) **Neutron metrology in the HFR: Neutron and gamma metrology in the free beam of HB 11.** Voorbraak, W.P.; Freudenreich, W.E.; Paardekooper, A.; Stecher-Rasmussen, F.; Verhagen, H.W. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Nov 1991. 21p. Project ECN: 1244.01. Order Number DE93602314. Source: OSTI; NTIS; INIS.

This work was performed under contract of the European Collaboration on Boron Neutron Capture Therapy.

Results are presented of the ECN measurements at the filtered HFR beam HB11. The neutron measurements took place in the free beam at full power. Several gamma measurements were performed at full power under different conditions. The neutron spectrum was obtained by adjusting a calculated spectrum with experimental results from activation foils. The gamma data were obtained with thermoluminescent dosimeters. (author). 5 refs.; 4 figs.; 4 tabs.

31551 (FRCEA-TH--360) **Development of a programmable CCD detector for imaging, real time studies and other synchrotron radiation applications.** Brizard, C. Grenoble-1 Univ., 38 (France). 15 Oct 1991. 268p. (In French). Order Number DE92566708. Source: OSTI; NTIS (US Sales Only); INIS.

A new CCD detector has been developed. The working of CCD and programmable detector is detailed in this thesis. The flexibility of the system allows the use of CCDs from different manufactures. The vacuum chamber of the detector is made of a beryllium window for experiments using X-radiation or of a quartz window coupled to a focusing optic system. Its temporal resolution is 2 microseconds with a X-radiation imaging. Images with a high spatial resolution have been obtained with the focusing system having a set of optical lenses and filters. The first X-ray diffraction experiments in the range of milliseconds and microseconds for the study of semiconductor heterostructures have been performed at X16 beam line at NSLS (National Synchrotron Light Source) with the detector illuminated by X-rays. For the first time, a X-ray beam, horizontally focused has been used to record a X-ray diffraction spectra on a 2-D detector. Finally, a X-ray diffraction method has been used to study the first steps of the crystallisation of $Fe_{8}0B_{2}0$ amorphous metallic alloy at X6 beam line at NSLS.

31552 (INIS-mf--13347, pp. 6) **Comparative tests of radon and radon daughter detection systems under simulated environmental conditions.** Steinhausler, F. (Salzburg Univ. (Austria)); Daschil, F.; Pfligersdorffer, P. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/air samplers; RADON 220

31553 (INIS-mf--13347, pp. 7) **Aerodynamic parameter determination in inlet orifice of CEA personal alpha dosimeter.** Yoshida, K. (Department of Social and Preventive Medicine, Saskatoon, SK (Canada)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. DOSEMETERS/air flow; AIR SAMPLERS; ALPHA DOSIMETRY; DOSEMETERS; RESPIRATION

31554 (INIS-mf--13347, pp. 13) **Calibration of the airborne radon daughter monitor.** Annanmaki, M. (Finnish Centre for Radiation and Nuclear Safety (STUK), Helsinki (Finland)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADIATION MONITORS/calibration; AEROSOL MONITORING; DAUGHTER PRODUCTS; CALIBRATION; RADON 222

31555 (INIS-mf--13347, pp. 14) **In-mine evaluation of continuous radon and working level detectors.** Briggs, M.R. (Colorado School of Mines, Golden, CO (United States)); King, R.H.; Franklin, J.C. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/radiation monitors; DAUGHTER PRODUCTS; RADON 222

31556 (INIS-mf--13347, pp. 14) **The development of track etch dosimeters for measuring radon daughter exposures.** Gingrich, J.E. (Terradex Corp., Walnut Creek, CA (United States)); Oswald, R.A.; Ward Alter, H. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/dosemeters; DAUGHTER PRODUCTS; DIELECTRIC TRACK DETECTORS; MINERS; DOSEMETERS; PERSONNEL DOSIMETRY; RADON 222; URANIUM MINES

31557 (INIS-mf--13347, pp. 15) **The development and field testing of the thermoluminescent personal dosimeter for measuring exposure to radon and thoron daughters.** Li, H. (Ministry of Nuclear Industry, Henyang, HN (China). Uranium Mining Research Inst.); Pu, Q. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/thermoluminescent dosemeters; DAUGHTER PRODUCTS; MINERS; PERSONNEL DOSIMETRY; RADON 220; RADON 222

31558 (INIS-mf--13347, pp. 29) **The Pylon 190: A novel filter calibration standard for alpha spectrometry.** Vandrish, G. (Pylon Electronic Development Co. Ltd., Ottawa, ON (Canada)); Theriault, K.; Ryan, F. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. ALPHA SPECTROMETERS/calibration standards; DAUGHTER PRODUCTS; RADON 220; RADON 222

31559 (INIS-mf--13347, pp. 29) **The transient response of radon and thoron chambers.** Pogorski, S. (Toronto Univ., ON (Canada). Dept. of Chemical Engineering and Applied Chemistry); Phillips, C.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. EMANOMETERS/response functions; AEROSOLS; CALIBRATION; EMANOMETERS; RADON 220; RADON 222

31560 (INIS-mf--13347, pp. 35) **EROS: Electronic radon observation system.** Annanmaki, M. (Finnish Centre for Radiation and Nuclear Safety (STUK), Helsinki (Finland)); Oksanen, E. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADIATION MONITORS/radon 222; MINES

31561 (INIS-mf--13347, pp. 35) **Mine tests of a passive electret dosimeter for radon/thoron daughters.** Khan, A. (Toronto Univ., ON (Canada). Dept. of Chemical Engineering and Applied

Chemistry); Phillips, C.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/dosemeters; DAUGHTER PRODUCTS; ELECTRETS; RADON 220; DOSEMETERS; URANIUM MINES

31562 (INIS-mf–13347, pp. 35-36) **Automatic discrimination and read-out of tracks of RaA and RaC, on CR39 using image analysis.** Pai, H.L. (R.A.D. Service and Instruments Ltd., Toronto, ON (Canada)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/alpha dosimetry; MINERS; PERSONNEL DOSIMETRY; URANIUM MINES

31563 (INIS-mf–13347, pp. 36) **A passive integrating radon dosimeter combining activated charcoal and TLD.** Stranden, E. (National Institute of Radiation Hygiene (Norway)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/dosemeters; ACTIVATED CARBON; ADSORPTION; BETA PARTICLES; DAUGHTER PRODUCTS; RADON; DOSEMETERS; THERMOLUMINESCENT DOSEMETERS

31564 (INIS-mf–13347, pp. 36) **Activated carbon filter paper method for the measurement of radon and thoron concentration.** Ri-Kai, W.; Hongquan, L.; Sheng-De, W.; Wang, M.C.; Tian, M.X. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/dosemeters; ACTIVATED CARBON; AIR FILTERS; RADON 220; DOSEMETERS

31565 (INIS-mf–13347, pp. 27-28) **New capabilities for measurement of natural radioactivity using high purity N-type germanium detectors.** Schery, S.D. (New Mexico Inst. of Mining and Technology, Socorro, NM (United States). Dept. of Physics). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. HIGH-PURITY GE DETECTORS/gamma spectroscopy; LEAD 210; NATURAL RADIOACTIVITY; QUANTITATIVE CHEMICAL ANALYSIS; URANIUM 234; URANIUM 238

31566 (INIS-mf–14069, pp. 57-61) **Detection of neutrons by BAF_2 TAPS modules in relativistic heavy ion collisions.** Kugler, A. (Nuclear Physics Inst. of Czechoslovak Academy of Sciences (Czechoslovakia)); Wagner, V.; Pachr, M.; Hlavac, S.; Wohlgemuth, R.; Simon, R.S.; Lorencz, R. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. NEUTRON DETECTION/solid scintillation detectors; NUCLEAR INSTRUMENT MODULES; NEUTRON SPECTRA; RELATIVISTIC RANGE; BARIUM FLUORIDES; CORRELATIONS; NEUTRON DETECTORS; RESPONSE FUNCTIONS

31567 (JINR–13-91-204) **The technique for measuring of the dip angle of the straight particle tracks in the nuclear emulsion by means of the meso-optical Fourier transform microscope.** Soroko, L.M.; Tereshchenko, V.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 12p. (In Russian). Order Number DE92644433. Source: OSTI; NTIS (US Sales Only); INIS.

The new technique designed to measure the dip angle of the straight particle track in the nuclear emulsion by means of the Meso-optical Fourier Transform Microscope is described. The experiments accomplished on the MFTM's model for two kinds of the test-objects are described. The predictions of the theory are compared with the results of the experiments. 17 refs.; 12 figs.

31568 (JINR–13-91-251) **Wide aperture scintillation hodoscope with FEU-85.** Afanas'ev, L.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems); Karpukhin, V.V.; Komarov, V.I.; Yaz'kov, V.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 12p. (In Russian). Order Number DE92644434. Source: OSTI; NTIS (US Sales Only); INIS.

A scintillation hodoscope for charged particle detection is described. The hodoscope has 48 counters with photomultipliers FEU-85. A set of CAMAC blocks registers numbers of counters and a time interval between signals. A data processing includes a compensation of delays in different channels and a light collection-time in the scintillator. The time interval is measured with the accuracy σ_1=08ns. 8 refs.; 5 figs.

31569 (JINR-E–13-91-175) **Inverse meso-optics and its potential applications.** Soroko, L.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 14p. Order Number DE92644426. Source: OSTI; NTIS (US Sales Only); INIS.

The properties of the invesrse meso-optics and its potential applications are described. The definitions of the meso-optics and the inverse meso-optics are given. Potential applications of the inverse meso-optics to the Cherenkov counter and to the ondulator radiation are reviewd. The optical properties of the self-focusing ondulator are described. 26 refs.; 18 figs.

31570 (JINR-N–2-48-91) **JINR rapid communications: Collection.** Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 45p. Order Number DE93000805. Source: OSTI; NTIS (US Sales Only); INIS.

Seperate abstracts were prepared for the individual papers in this report.

31571 (JINR-N–2-48-91, pp. 29-38) **Electrical transparency of grids used in gaseous particle detectors.** Khazins, D.M.; Kuritsin, A.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. In *JINR rapid communications: Collection.* 45p. Order Number DE93000805. Source: OSTI; NTIS (US Sales Only); INIS.

Electrical transparency of wire grids used in gaseous particle detectors is examined. A method for measuring the transparency is developed. The experimental results are presented for two kinds of grids (linear grids made from parallel wires and meshes made from crossed wires) with various radius-pitch ratios. The experimental results are compared with the transparency calculations. 2 refs.; 11 figs.

31572 (JINR-N–2-48-91, pp. 39-45) **Study of characteristics of flat scintillation detectors with a fiber optics light guide for the multilayer charged-particle ΔE-spectrometer.** Gladyshev, V.A. (and others); Golubeva, M.B.; Goncharenko, O.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High

Energy. 1991. (In Russian). In *JINR rapid communications: Collection.* 45p. Order Number DE93000805. Source: OSTI; NTIS (US Sales Only); INIS.

The design is described and characteristics are studied for a flat scintillation detector with the light guide on the base of re-emitting fiber optics. A high uniformity of the light collection over the detector area and the light yield in 20 photoelectrons per 1 MeV of ionization losses in the detector are obtained. A possibility of the construction of detectors with a large area and high-amplitude resolution is proved. 2 refs.; 6 figs.

31573 (JINR-R–1-90-32) **Investigation of two-track resolution efficiency of the VKD vertex detector using simulation of p-barp interactions at 6 TeV.** Vodop'yanov, A.S.; Golovatyuk, V.M.; Denisenko, K.G.; Denisenko, N.L.; Tsyganov, Eh.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1990. 10p. (In Russian). Order Number DE92644429. Source: OSTI; NTIS (US Sales Only); INIS.

Some characteristics of proton-antiproton interactions at E_{cm}=6 TeV are obtained. Events with jets from c, b and t-quarks were generated by the program ISAJET. The angles between the nearest neighbouring particles in the jets within a jet momentum range of 300-3000 GeV/c were analyzed. It is shown that the jet angle width $\Delta\Theta$=(180±20) mrad for a the jets with a momentum less than 500 GeV/c and $\Delta\Theta$=±10 mrad for momentum less than 100 GeV/c. The possibility of separation of two tracks from one high momentum jet by vertex microstrip detector is considered. It is shown that less than 85% of all particles can be separated if the resolution of two particles is 100 μm. However, if the second coordinate is measured with the same accuracy, then 98% of all tracks in an event can be separated. 7 refs.; 11 figs.; 1 tab.

31574 (JINR-R–1-91-88) **Calculations of a two-dimensional pulsed magnetic field of an emulsion detector coil by the combined method.** Kovalenko, A.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy); Titkov, V.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 8p. (In Russian). Order Number DE92644431. Source: OSTI; NTIS (US Sales Only); INIS.

The method of calculation of two-dimensional pulsed magnetic fields formed by a thick single-turn coil has been proposed. In this case electro-magnetic field partial derivative equations are used for field computations inside the coil internal region and an integral equation constructed relative to an arbitrary chosen surface current density which provides the field equivalent to that of real currents, is used for the external region. This approach is used for field computations of the setup SLON aimed to expose nuclear emulsion stacks in a high magnetic field. 6 refs.; 5 figs.

31575 (JINR-R–1-91-209) **Triggering system for relativistic hypernuclei detection.** Golokhvastov, A.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy); Belikov, Yu.A.; Kondrat'ev, V.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 16p. (In Russian). Order Number DE92644430. Source: OSTI; NTIS (US Sales Only); INIS.

A trigger system of the GIBS-spectrometer with a streamer chamber is described. The system has been used to search for relativistic hyperfragments. The events are selected by scintillation counters. The following feature of the two-body π^--mesonic decay of hypernuclei is used for triggering: the charge of the residual nucleus is greater than that of the hyperfragment. Characteristics of the detectors and estimations of the detection efficiency are described. 14 refs.; 4 figs.

31576 (JINR-R–7-91-224) **Setup for separation and investigation of β-n decay of neutron-rich nuclei.** Luk'yanov, S.M. (and others); Skobelev, N.K.; Sokol, E.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 11p. (In Russian). Order Number DE92644405. Source: OSTI; NTIS (US Sales Only); INIS.

A setup TETRA for producing and studying properties of the lightest neutron rich nuclei in the reactions induced by heavy ions with energy 20 MeV/n is described. This array allows to measure half-lives of β-decay, probabilities of β-delaed neutron emission and neutron multiplicities. The efficiency for detection of β-particles is 0.95, of single neutrons - 0.315. The half-lives probabilities of β-delayed neutron multiplicities for devay of ^{8}He, ^{11}Li, ^{12}Be and ^{13}B were measured. 13 refs.; 6 figs.; 1 tab.

31577 (JINR-R–10-90-83) **Analysis of data from the HYPERON facility in experimental investigation of the inclusive production of K^0 and K^{*0}(892) mesons.** Vinogradov, V.B. (AN Belorusskoj SSR, Minsk (Belarus). Inst. Fiziki); Litov, L.B.; Kul'chitskij, Yu.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1990. 14p. (In Russian). Order Number DE92644432. Source: OSTI; NTIS (US Sales Only); INIS.

The flowsheets of the analysis of information obtained in experimental investigation of the inclusive production of K^0 and K^{*0}(892) mesons on the HYPERON facility is described. The principal algorithms used in the data processing are considered. The obtained accuracy characteristics of the measured physical values are given. The software presented could be used in treatment of the data obtained in analogous spectrometers. 15 refs.; 8 figs.; 1 tab.

31578 (JINR-R–10-91-155) **A system for experiments automation on the neutron diffractometer DN-2 at the pulsed reactor IBR-2.** Balagurov, A.M. (and others); Barabash, I.P.; Zhironkin, G.F. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1991. 12p. (In Russian). Order Number DE92644404. Source: OSTI; NTIS (US Sales Only); INIS.

The hardware and software of the system for experiments automation at the neutron diffractometers are described. 27 refs.; 5 figs.

31579 (JINR-R–13-91-337) **The experimental setup for optical spectra measurements with a pulsed laser.** Blashchak, Z. (and others); Gagrskij, Yu.P.; Gradechny, Ch. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 7p. (In Russian). Order Number DE92644540. Source: OSTI; NTIS (US Sales Only); INIS.

The experimental setup for investigation of optical spectra with pulsing dye laser LGI-504 is described. The resonance fluorescence method for detection of investigated atoms is used. Substance evaporation is performed by using a thermal heating of tantalum crucible. The frequency resolution was about 1 GHz for optical line 576 nm Eu1. Minimal atoms flux 10^7 s^{-1} can be detected in the experiment. 5 refs.; 2 figs.

31580 (KEK-PROC–91-14, pp. 84-91) **Calculations of bremsstrahlung photon spectrum from β-ray radioisotopes.** Tanaka, Shun-ichi (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240–: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

An empirical formula for calculating bremsstrahlung spectra from β-ray radioisotopes has been verified using EGS4 code. The comparison with experiment for mono-energetic electrons demonstrated that the calculations with the EGS4 code would overestimate significantly the bremsstrahlung production from thick targets in the energy less than 2 MeV. It was suggested that bremsstrahlung production cross section updated by Pratt are different to a great degree from the old based on the Boron approximation in the energy below 2 MeV, and the Elwert factor neglected in EGS4 code is unable to explain the overestimation. (author).

31581 (KEK-PROC–91-14, pp. 39-43) **Effects of the point-like nucleus model on the EGS simulation results.** Nakatsuka, Takao (Nagoya Women's Univ. (Japan)); Kitamura, Takashi. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240–: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

Although EGS simulation code has predicted many excellent results in various transport problems of charged particles, some discrepancy from experimental data is yet found in calculation of mean square deflection angle. We estimated reconstruction error of arrival direction observed in water cherenkov detector by the classical Fermi theory, which showed fairly good agreement with experimental data. On the other hand, a similar estimation made by Kamioka group using EGS code gave tendency of higher value at electron energy greater than about 20 MeV, and lower value at less energy. The discrepancy seems attributed on the Moliere formula used in EGS code. As well known, the formula gives divergence of mean deflection angle due to point-like model of nucleus, instead it gives high accuracy of angular distribution. Suppression of large angle scattering due to intereference by nucleus is not considered in EGS simulation. To keep accuracy also in the $<\theta^2>$ estimation, it would be a practical method to introduce cut at about λ/d in the second term, or the single scattering term, of Moliere solution. (author).

31582 (KEK-PROC-91-14, pp. 44-47) **Running EGS4 on Unix workstations and personal computers.** Namito, Yoshihito (National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan)). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240-: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

Several points, which should be taken care when a EGS4 user run the EGS4 on Unix workstations or personal computers are discribed. The NRCC version EGS4, which has already modified to run on Unix workstations and IBM-PCs are introduced. (author).

31583 (KEK-PROC-91-14, pp. 48-73) **Improvement in the EGS4 code system - general purpose electron-photon Monte Carlo transport code system.** Momose, T. (Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki (Japan). Tokai Works); Nojiri, I.; Narita, O.; Iwai, S.; Rintsu, Y.; Sato, O.; Nakamura, M. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240-: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

This work describes the development of a general purpose users' version of the EGS4 code system. Users can use this version to solve complicated geometrical problems, without the knowledge of MORTRAN3 language and the techniques of devising user-written subroutines. We have developed a new version of the EGS4 code system, and have named it 'the general purpose users version of the EGS4 code system.' In order to design and develop the general purpose version, we have investigated the typical multi-purpose three-dimensional Monte Carlo shielding codes of MORSE-SGC and MCNP, and criticality codes of KENO-Va and MONK-6.3 for reference. The multi-purpose user-written subroutines for geometrical modeling, sources, detectors, and variance reduction have been yielded. Incorporating these subroutines into the original EGS4 code, we have accomplished the general purpose version of the EGS4 code system without requiring user-written subroutines and the knowledge of MORTRAN3 language. Two following sample problems were applied to this version for verification: (1) Skin dose equivalent evaluation from β-rays emitted from ^{90}Sr, (2) Bremsstrahlung dose evaluation generated in a iron sphere having a point source of ^{90}Y in the center. These calculational result agree well with results in other calculational methods, respectively. (J.P.N.).

31584 (LAPP-EXP-91-05) **High resolution crystal calorimetry at LHC.** Schneegans, M. (Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires); Ferrere, D.; Lebeau, M.; Vivargent, M.; Lecoq, P. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. 1991. 10p. (CONF-9105353-: 5. Pisa symposium on advanced detectors, Elba (Italy), 26-31 May 1991). Order Number DE93703725. Source: OSTI; NTIS (US Sales Only); INIS.

The search for Higgs bosons above Lep200 reach could be one of the main tasks of the future pp and ee colliders. In the intermediate mass region, and in particular in the range 80-140 GeV/c^2, only the 2-photon decay mode of a Higgs produced inclusively or in association with a W, gives a good chance of observation. A 'dedicated' very high resolution calorimeter with photon angle reconstruction and pion identification capability should detect a Higgs signal with high probability. A crystal calorimeter can be considered as a conservative approach to such a detector, since a large design and operation experience already exists. The extensive R and D needed for finding a dense, fast and radiation hard crystal, is under way. Guide-lines for designing an optimum calorimeter for LHC are discussed and preliminary configurations are given. (author) 7 refs., 3 figs., 2 tabs.

31585 (LAPP-EXP-91-07) **A data simulation program for the VIRGO detector.** Mours, B.; Wingerter-Seez, I. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. 2 Oct 1991. 4p. (CONF-9106297-: 6. Marcel Grossmann meeting on general relativity, Kyoto (Japan), 23-29 Jun 1991). Order Number DE93703729. Source: OSTI; NTIS (US Sales Only); INIS.

The possibility and the need for a data simulation program are discussed in the context of a large interferometer like the VIRGO gravitational wave detector. The goal of the Virgo project, is to build a large Michelson interferometer to detect and study possible gravitational waves. The status of the program and preliminary results are discussed. (R.P.) 5 refs., 3 figs.

31586 (LYCEN-T-9115) **Detection of single photons in the L3 experiment.** Buisson, C. Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire; Lyon-1 Univ., 69 (France). May 1991. 33p. (In French). Order Number DE93701125. Source: OSTI; NTIS (US Sales Only); INIS.

This work is based on data taken with the L3 detector at LEP (electron-positron collider) built at the CERN laboratories in Geneva. The first results on the measurement of the $e^+e^- \to \nu \mathrm{anti}\nu\gamma$ cross section are presented. In the first part of the thesis we give a general overview on the recently obtained values for N_ν through various methods. We also point out the importance of measuring the single photon cross section in order to determine this parameter in the framework of the Standard Model. This measurement can also give valuable insights as to what happens beyond the S.M. specially concerning supersymmetric and composite models. We end with a review of the generators used for simulating the signal and the various background processes present in this measurement. The second chapter describes the L3 detector with a particular emphasis given to the electromagnetic calorimeter, built using BGO crystals. We also describe the simulation software used by L3. In the third chapter we give a detailed presentation of the routines and criteria used for our single photon signal data acquisition. We show how, by also selecting single electrons, we can study this sample in order to gain a better understanding of the background generator. The last chapter describes the analysis work done on the various data samples, the comparison between Monte Carlo and data, and the procedure used to extract the number of families N_ν. With our sample of single photons, corresponding to an integrated luminosity of 2.98 pb^{-1}, with a center of mass energy from M_{Z^0} - 3GeV to M_{Z^0} + 3 GeV, we obtain N_ν=3.3±0.6(stat.)±0.3(syst.).

31587 (ORNL/TM-11882, pp. 9-18) **The status of ANSI N13.11 - The dosimeter performance test standard.** Sims, C.S. (Oak Ridge National Lab., TN (United States)). Oak Ridge National Lab., TN (United States). Oct 1991. DOE Contract AC05-84OR21400. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The standard designated ANSI N13.11 was issued in 1983 and is the basis for the dosimeter performance test associated with the National Voluntary Laboratory Accreditation Program (NVLAP). The standard is important because the Nuclear Regulatory Commission requires that all licensees use personnel dosimeters processed by NVLAP-accredited processors. The standard has undergone review and modifications have been recommended. Historical information concerning the development and utilization of the present standard, ANSI N13.11-1983, is presented. Details associated with the review of the standard (e.g., policy, group selection) are then given.

Finally, the modifications recommended by the review group are discussed.

31588 (ORNL/TM–11882, pp. 19-30) **Why change the x-ray conversion factors in ANSI N13.11?.** Zeman, G.H. (AT and T Bell Labs., Murray Hill, NJ (United States)); Soares, C.; Devine, R.T. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The personnel dosimetry calibration procedures defined in ANSI N13.11-1983 revolutionized and standardized the practice of personnel dosimetry in the United States. Because of new data and concepts which have appeared in the last decade, it is now necessary to update the original procedures. The calibration scheme outlined in this paper is consistent with the latest concepts and recommendations of the International Commission on Radiation Units and Measurements and incorporates current information from the National Institute of Standards and Technology on ionization chamber calibrations and x-ray spectral data. Advantages of the proposed scheme include the conceptual simplicity in using a tissue equivalent slab phantom to represent an individual person's body for defining the reference dose equivalent quantities; this also makes it possible to carry out practical measurements of these quantities. For testing purposes, the PMMA phantom has proven to be practical and rugged, and it should continue to be used as the US standard phantom for test irradiations. Correction of the basic dose equivalent quantities for differences in phantom backscatter is now possible due to the availability of BSF results for different shapes and compositions of material. Disadvantages of the proposed calibration scheme include the fact that some of the Cx factors will change by as much as 20%, while others will remain relatively unchanged.

31589 (ORNL/TM–11882, pp. 31-39) **The minimum measurable dose of the sensitive Harshaw TLDs.** Ben-Shachar, B. (Nuclear Research Center - Negev, Beersheba (Israel)); German, U.; Naim, E. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The TL-dose response was measured for the sensitive Harshaw manufactured phosphors (CaF_2:Dy and CaF_2:Tm), taking chips from the same batch and from different batches. The relative standard deviations were fitted to a semiempirical expression, from which the minimum measurable doses were derived and compared to the minimum measurable dose calculated by taking 3 times the standard deviation of unirradiated chips. The contribution of the individual calibration of each TLD chip was checked, as well.

31590 (ORNL/TM–11882, pp. 41-50) **Advancement and application of bubble detector technology.** Buckner, M.A. (Oak Ridge National Lab., TN (United States)); Casson, W.H.; Sims, C.S. Oak Ridge National Lab., TN (United States). Oct 1991. DOE Contract AC05-84OR21400. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

A new technology is vying for position in the dosimetry community. This relatively young technology is building upon the foundation of the bubble chamber, conceptualized by Glaser in 1952. Although the attitudes surrounding this technology are somewhat mixed, applications of this technology hold great promise for the future of neutron dosimetry. The Dosimetry Applications Research facility of Oak Ridge National Laboratory is looking into some innovative applications of this technology. The authors are investigating options for overcoming its limiting features in hopes of achieving an unprecedented level of proficiency in neutron detection. Among these are the developing and testing of a Combination Area Neutron Spectrometer, CANS, assessing the plausibility of extremity applications, the assembly of an alternative reader for research, investigation of temperature-related effects and how to correct for them and considerations on the coming of age of neutron dosimetry via real time detection of bubble formation in Bubble Technology Industries Inc. detectors. The authors attempt to answer the questions: (1) What areas hold the greatest promise for application of this emerging technology?; (2) What obstacles must be overcome before full-blown application becomes a reality?; and (3) What might the future hold?

31591 (ORNL/TM–11882, pp. 51-59) **An approved personal dosimetry service based on an electronic dosimeter.** Marshall, T.O. (National Radiological Protection Board, Oxon (United Kingdom)); Bartlett, D.T.; Burgess, P.H.; Campbell, J.I.; Hill, C.E.; Pook, E.A.; Sandford, D.J. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

At the Second Conference on Radiation Protection and Dosimetry a paper was presented which, in part, announced the development of an electronic dosimeter to be undertaken in the UK by the National Radiological Protection Board (NRPB) and Siemens Plessey Controls Ltd. This dosimeter was to be of a standard suitable for use as the basis of an approved personal dosimetry service for photon and beta radiations. The project has progressed extremely well and dosimeters and readers are about to become commercially available. The system and the specification of the dosimeter are presented. The NRPB is in the process of applying for approval by the Health and Safety Executive (HSE) to operate as personal monitoring service based on this dosimeter. As part of the approval procedure the dosimeter is being type tested and is also undergoing an HSE performance test and wearer trials. The tests and the wearer trials are described and a summary of the results to date presented. The way in which the service will be organized and operated is described and a comparison is made between the running of the service and others based on passive dosimeters at NRPB.

31592 (ORNL/TM–11882, pp. 60-68) **Dose calculation algorithm for the Department of Energy Laboratory Accreditation Program.** Moscovitch, M. (Georgetown Univ., Washington, DC (United States)); Tawil, R.A.; Thompson, D.; Rhea, T.A. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The dose calculation algorithm for a symmetric four-element LiF:Mg,Ti based thermoluminescent dosimeter is presented. The algorithm is based on the parameterization of the response of the dosimeter when exposed to both pure and mixed fields of various types and compositions. The experimental results were then used to develop the algorithm as a series of empirical response functions. Experiments to determine the response of the dosimeter and to test the dose calculation algorithm were performed according to the standard established by the Department of Energy Laboratory Accreditation Program (DOELAP). The test radiation fields include: ^{137}Cs gamma rays, ^{90}Sr/^{90}Y and ^{204}Tl beta particles, low energy photons of 20-120 keV and moderated ^{252}Cf neutron fields. The accuracy of the system has been demonstrated in an official DOELAP blind test conducted at Sandia National Laboratory. The test results were well within DOELAP tolerance limits. The results of this test are presented and discussed.

31593 (ORNL/TM–11882, pp. 69-79) **Calibration correction factors for the Los Alamos neutron well.** Olsher, R.H. (Los Alamos National Lab., NM (United States)). Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

Portable neutron dose rate meters are calibrated at Los Alamos using a Pu-239/Be (PuBe) neutron source. The source is located in a vertical well and rides on top of an elevator mechanism to vary the dose rate at the top of the well. Instruments are positioned over the well and are exposed at a source-to-detector distance in the range of 25 cm-300 cm to dose rates from several mrem/h to several hundred mrem/h. The dose rate at the top of the well is measured with an Eberline NRD detector that has been calibrated to the source free-in-air. The NRD detector is a 9-in. polyethylene sphere with an internal cadmium foil loading. A BF_3 counter tube is located in the center of the sphere. The complete well calibration procedure is given.

31594 (ORNL/TM–11882, pp. 85-94) **The employment of quartz glasses for dosimetry of ionic radiation.** Alimov, R. (Inst. of Nuclear Physics, Tashkent (Uzbekistan)); Gulamova, R.R.; Gasanov, E.M.; Sazonova, E.V. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The detectors were created for dosimetry of the ^{60}Co gamma and proton radiations and the gamma-component of reactor radiation based on the glasses KI fused from the quartz of the Volyn deposit. The absorbed dose within the dose interval of 10 to 5.10^3 Gy can be measured by the thermoluminescence (TL) intensity and within the interval of 5.10^3 to 2.10^5 Gy is by the induced optical density at 550 nm. The detectors based on the quartz glasses KV and KU-1 measuring the absorbed dose by the induced optical density at 215 nm were proposed for the gamma-radiation dose interval from 5.10^5 to 5.10^7 Gy.

31595 (ORNL/TM–11882, pp. 95-98) **Detecting low gamma radiation doses using silica glass luminescence.** Abdukadyrova, I.Kh. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

This study investigates the spectroscopic characteristics of the radiation in the reactor and of the γ-course ^{60}Co silica glasses produced by industry. The purpose of this investigation is the determination of the growth kinetics of radiation damage, stability, dependence on radiation mode, irradiation conditions and the possible use of glass in compound fields of reactors in 10^{15}-10^{20} cm^{-2} range and absorbed dose of the photon from 10^0-10^6 Gy. Three types of glass were studied and the optical registering methods have been chosen (the photoluminescence and optical absorption spectra were measured before and after irradiation).

31596 (ORNL/TM–11882, pp. 117-118) **A radiation-stable intensity meter for ionizing radiation based on alloyed silicon.** Yunucov, M.C. (Inst. of Nuclear Physics, Tashkent (Uzbekistan)); Akhmadalyev, A.; Begmatov, K. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

Applied and fundamental investigations in the field of nuclear radiation detection are perspective and important. Among different technical tools for measuring nuclear radiation parameters, semiconducting structures occupy one of the leading places. Wide application of semiconducting detectors is caused by the following advantages: high energy resolution, fast response, wide range of dose power measured, various detectors designing possibility, compactness, etc. Investigations were carried out to create a p-i-n detector of γ-irradiation dose power, having high radiation resistance, and the possibility of its application as an absorption dose dosimeter.

31597 (ORNL/TM–11882, pp. 119-129) **Space Shuttle dosimetry measurements with RME-III.** Hardy, K.A. (Armstrong Lab./OEDR, Brooks AFB, TX (United States)); Golightly, M.J.; Hardy, A.C.; Atwell, W.; Quam, W. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

Spacecraft crews risk exposure to relatively high levels of ionizing radiation. As missions are directed to higher radiation level orbits, radiation exposure could well be a major factor for crew stay times or career lengths. In order to more accurately define the radiological exposure and risk to the crew, active real-time radiation monitoring instrumentation must be flown which are capable of identifying and measuring the various radiation components. The RME-III is a self-contained, portable, active dosimeter system adapted for use in measuring the ionizing radiation environment on the Space Shuttle. RME stands for radiation monitoring equipment, the title given to two prototype radiation instruments successfully flow by the US Air Force on several pre-Challenger shuttle missions. These prototype instruments had relatively short battery lifetimes and very limited memory capacity, thereby requiring an inordinate amount of crew interaction time. The RME-III was developed to incorporate the capabilities of both radiation instruments into a single unit and to minimize crew interaction times with longer battery life and expanded memory capacity. A description of the RME-III instrument and the results obtained from flight on six Space Shuttle missions flown thus far are presented in this report.

31598 (OUP–92-20) **Absolute in situ energy calibration of luminosity calorimeters in the DELPHI experiment at LEP.** Bugge, L. (Oslo Univ., Fysisk Inst. (Norway)); Dam, M.; Read, A.L.; Myrheim, J.; Skjevling, G. Oslo Univ. (Norway). Fysisk Inst. Jul 1992. 20p. Order Number DE93602224. Source: OSTI; NTIS; INIS.

Methods to perform the absolute energy calibration of DELPHI's Small Angle Tagger luminosity calorimeters at LEP are presented and compared. The input was small angle Bhabha scattering events. A significant non-linearity in the response of the calorimeters was observed. The conjugate gradient method was applied to solve the least square problem. This method is particularly useful for least squares problems which are large, ill-behaved or even singular, and for cases with a sparse coefficient matrix. 8 refs., 14 figs., 2 tabs.

31599 (OUP–92-21) **SIRI - A proposal for a multi-detector ΔE-E particle telescope.** Guttormsen, M. Oslo Univ. (Norway). Fysisk Inst. Jun 1992. 23p. Order Number DE93602225. Source: OSTI; NTIS; INIS.

The CACTUS detector system which is mounted on the 90° beam line of the Oslo Cyclotron consists of 28 NaI and 2 Ge detectors in combination with 8 Si particle telescopes. The Si particle telescopes are however based on an old technology with a geometrical lay-out that prohibits further increase in efficiency. In this report a replacement of the old system in the form of 64 telescopes based on silicon strip detectors is proposed. For the planned system called SIRI (Silicon Ring), the detectors are located on a ring around the target, covering the angles between 30° and 60° relative to the beam direction. The planned detector system will increase detector efficiency of charged particles by a factor 8. The design and construction of the new detector system is described and discussed. 8 refs., 9 figs., 4 tabs.

31600 **Sample holder for x-ray diffractometry.** Hesch, V.L. To Dept. of Energy. 1991. USA Patent patent application 7-641,832. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019837. Source: OSTI; NTIS; GPO Dep.

A sample holder for use with x-ray diffractometers with the capability to rotate the sample, as well as to adjust the position of the sample in the x, y, and z directions. Adjustment in the x direction is accomplished through loosening set screws, moving a platform, and retightening the set screws. Motion translators are used for adjustment in the y and z directions. An electric motor rotates the sample, and receives power from the diffractometer.

31601 (UCRL-JC–111174) **A lossless one-pass sorting algorithm for symmetric three-dimensional gamma-ray data sets.** Brinkman, M.J.; Manatt, D.R.; Becker, J.A.; Henry, E.A. Lawrence Livermore National Lab., CA (United States). 30 Jun 1992. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920548–3: Workshop on large gamma-ray detector arrays, Ottawa (Canada), 18-23 May 1992). Order Number DE92019379. Source: OSTI; NTIS; GPO Dep.

An algorithm for three-dimensional sorting and storing of the large data sets expected from the next generation of large gamma-ray detector arrays (i.e., EUROGAM, GAMMASPHERE) is presented. The algorithm allows the storage of realistic data sets on standard mass storage media. A discussion of an efficient implementation of the algorithm is provided with a proposed technique for exploiting its inherently parallel nature.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

Refer also to citation(s) 31541

31602 (CNIC–00376) **The technology and application study of NTD CZ silicon for pressure sensing elements.** Chen Bingxian (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Gao Xiuqing; Gao Jijin; Li Shiling. China Nuclear Information Centre, Beijing, BJ (China). Apr 1991. 11p. (In Chinese). (IAE–0071.). Order Number DE93602322. Source: OSTI; NTIS (US Sales Only); INIS.

A study of pressure sensing elements made of low-resistivity CZ silicon crystal (8 ≈ 12 Ωcm) with deep-irradiation has been completed. The main contents are as follows: (1) The trace heavy metal impurities in the new CZ and FZ Si are measured by the neutron activation analyzing method to look into the improved growth technique of natural single crystal; (2) Under the same condition of deep-irradiation, the CZ, FZ Si beta radioactivity decay curves which were obtained by the track measurement with a low-background beta device are same. This means that the CZ Si can be doped with NTD process just as same as the FZ Si; (3) The process study of NTD for low-resistivity CZ Si has been completed if the value of electron mobility is properly selected in accordance with the target resistivity and the value of doping coefficient K is determined by experiments, the doping accuracy can be ensured and remarkably raised. Comparing with the normal doping method, the doping hitting accuracy is increased from 40% to 90%, the radial nonuniformity $\Delta\rho$ is less than 5% and the radial microarea nonuniformity $\Delta\rho_m$ is less then 3-5%. The first batch of irradiated products of low-resistivity NTD CZ Si has been used for the pressure sensing elements. The results are satisfied and the performance of pressure sensing element has reached to the prescribed standard. The rate of qualified and high quality products has been increased from 40% to 60%. It is obvious that the NTD CZ Si is much better than the ordinary CZ Si.

31603 (FNAL-TM–1784) **Development of radiation hard scintillators.** Markley, F. (Fermi National Accelerator Lab., Batavia, IL (United States)); Woods, D.; Pla-Dalmau, A.; Foster, G.; Blackburn, R. Fermi National Accelerator Lab., Batavia, IL (United States). May 1992. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9204138–7: International conference of radiation-tolerant scintillators and detectors, Tallahassee, FL (United States), 28 Apr - 2 may 1992). Order Number DE92040439. Source: OSTI; NTIS; INIS; GPO Dep.

Substantial improvements have been made in the radiation hardness of plastic scintillators. Cylinders of scintillating materials 2.2 cm in diameter and 1 cm thick have been exposed to 10 Mrads of gamma rays at a dose rate of 1 Mrad/h in a nitrogen atmosphere. One of the formulations tested showed an immediate decrease in pulse height of only 4% and has remained stable for 12 days while annealing in air. By comparison a commercial PVT scintillator showed an immediate decrease of 58% and after 43 days of annealing in air it improved to a 14% loss. The formulated sample consisted of 70 parts by weight of Dow polystyrene, 30 pbw of pentaphenyltrimethyltrisiloxane (Dow Corning DC 705 oil), 2 pbw of p-terphenyl, 0.2 pbw of tetraphenylbutadiene, and 0.5 pbw of UVASIL299LM from Ferro.

31604 (JINR-R–13-91-201) **Investigation of soft errors in VLCIC RAM under influence of heavy ions.** Goleminov, N.G. (Moskovskij Inzhenerno-Fizicheskij Inst., Moscow (Russian Federation)); Akin'shin, D.V.; Didyk, A.Yu.; Skuratov, V.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 8p. (In Russian). Order Number DE92644554. Source: OSTI; NTIS (US Sales Only); INIS.

The data about deposition of electromagnetic and nuclear processes of galactic cosmic ray interaction with VLCIC (very large scale integrated circuits) constructive materials are presented. The experimental results of the investigations of VLCIC RAM response on of about 1 MeV/a.m.u. heavy ion influence are given. In particular, the energetic dependence of memory element sensitivity and temporary dependence of soft error accumulation are described. 6 refs.; 3 figs.; 2 tabs.

4405 Thermal Instrumentation

31605 (CNIC–00337) **Spatial filtring and thermocouple spatial filter.** Han Bing (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Tong Yunxian. China Nuclear Information Centre, Beijing, BJ (China). Dec 1989. 11p. (In Chinese). (TSHUNE–0011.). Order Number DE93602310. Source: OSTI; NTIS (US Sales Only); INIS.

The design and study on thermocouple spatial filter have been conducted for the flow measurement of integrated reactor coolant. The fundamental principle of spatial filtring, mathematical descriptions and analyses of thermocouple spatial filter are given.

31606 (CNIC–00341) **Development and research of in-core transducers at IAE (Institute of Atomic Energy).** Huang Yucai (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Qian Shunfa; Jia Guozhen. China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 6p. (In Chinese). (IAE–0068.). Order Number DE93602311. Source: OSTI; NTIS (US Sales Only); INIS.

The development of in-core transducers at IAE (Institute of Atomic Energy) and their applications in in-pile fuel assembly test are mentioned. These transducers include mainly tubed tungsten-rhenium thermocouple assembly, displacement transducer of linear variable differential transformer, pressure transducer of membrane type, gamma thermometer, turbine flow meter, self-powered neutron detector etc.

31607 (CNIC–00468) **Thermocouple calibration facility for 2900 deg C high temperature and its applications.** Chen Dalong (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy). China Nuclear Information Centre, Beijing, BJ (China). Jan 1991. 15p. (In Chinese). (IAE–0088.). Order Number DE93602313. Source: OSTI; NTIS (US Sales Only); INIS.

The construction and the performance characteristic of a 2900 deg C high temperature thermocouple calibration facility are described. The calibration error analysis is made. The test results of the calibration characteristics of high temperature thermocouples Mo/Nb, W-3Re/W-25Re, and W-1Mo/W-25Mo are given. The test result of temperature dependent resistivity of BeO made by this facility is given.

31608 (KCP–613-4669) **Digital imaging systems: Final report.** Mozzano, S.G.; Watterson, C.E. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019194. Source: OSTI; NTIS; GPO Dep.

The Advanced Vision Information System (AVIS) was a long-term development project for the engineering technical thrust for intelligent vision systems. The goal of the project was to develop an image processing capability in the laboratory through which advanced automated image analysis techniques could be achieved. From the many instruments in the Materials Evaluation laboratory which provide video output data, three were selected for initial development activities. The instruments selected were the infrared camera, the metallograph, and electron optics. To the application development activities for these instruments were added the development of the laboratory network for transferring image data, the development of a standardized image processing workstation, and a nondestructive measurement capability. Since the project had such a broad scope, each of six activities was established as a subproject.

31609 Refractory thermowell for continuous high temperature measurement of molten metal. Thiesen, T.J. To Dept. of Energy. 22 Jan 1991. USA Patent patent application 7-643,320. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019840. Source: OSTI; NTIS; GPO Dep.

An apparatus for the continuous high temperature measurement of materials in vessels lined with rammed or cast refractory materials. A refractory housing member is integral with the refractory lining of the vessel and contains a plurality of high temperature sensing means, such as thermocouples. A face of the housing is flush with the refractory lining and contacts the high temperature material contained in the vessel. Continuous temperature measurement is achieved by a means which is coupled to the thermocouples for indicating the temperature.

4406 Optical Instrumentation

Refer also to citation(s) 31076, 31077, 31419, 31516, 31627, 31634, 32054, 32055

31610 (CONF-9203173–1) **Laser surface profilometer with sub-Angstrom resolution.** Mansur, D.J.; Voorhes, D.W.; Wyntjes, G. OPTRA, Inc., Beverly, MA (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-88ER80585. From 1992 conference on microlithography; San Jose, CA (United States); 8-13 Mar 1992. Order Number DE92018926. Source: OSTI; NTIS; GPO Dep.

Single point diamond turning technology, has allowed the manufacture of highly aspheric optics that were unimaginable just a few years ago. Testing these optics is typically either expensive (i.e. null lens systems), destructive (contacting stylus profilers), or slow (existing optical profilers). We describe a noncontacting surface profilometer with 5 μm lateral spatial resolution and sub-Angstrom height resolution. The instrument is configured as a polarizing interferometer that operates at near zero path difference and uses a visible laser diode as a light source. The instrument incorporates an autofocussing mechanism that allows high resolution profilometry over a vertical range of ±1 mm. The system bandwidth of 200 kHz allows for very fast profiling (87 cm/sec) without loss of resolution. The sensor head is very compact (6 × 6 × 10 cm) and all the processing electronics are contained on a single PC-compatible card. The instrument's autofocussing feature, high speed capability and compact size make it ideally suited for inprocess and final acceptance testing of steep aspheric optics. We will present data that demonstrates our ability to accurately measure the macroscopic and microscopic features of single point diamond turned aspheric optics typically used in high resolution X-ray lithography systems.

31611 Variable path length spectrophotometric probe. O'Rourke, P.E.; McCarty, J.E.; Haggard, R.A. To Dept. of Energy. 1991. USA Patent patent application 7-641,978. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019834. Source: OSTI; NTIS; GPO Dep.

This invention consists of a compact, variable pathlength, fiber optic probe for spectrophotometric measurements of fluids in situ . The probe comprises a probe body with a shaft having a polished end penetrating one side of the probe, a pair of optic fibers, parallel and coterminous, entering the probe opposite the reflecting shaft, and a collimating lens to direct light from one of the fibers to the reflecting surface of the shaft and to direct the reflected light to the second optic fiber. The probe body has an inlet and an outlet port to allow the liquid to enter the probe body and pass between the lens and the reflecting surface of the shaft. A linear stepper motor is connected to the shaft to cause the shaft to advance toward or away from the lens in increments so that absorption measurements can be made at each of the incremental steps. The shaft is sealed to the probe body by a bellows seal to allow freedom of movement of the shaft and yet avoid leakage from the interior of the probe.

31612 Optical monitor for observing turbulent flow. Albrecht, G.F.; Moore, T.R. To Dept. of Energy. 1991. USA Patent patent application 7-642,577. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019831. Source: OSTI; NTIS; GPO Dep.

The present invention provides an apparatus and method for non-invasively monitoring turbulent fluid flows including anisotropic flows.The present invention uses an optical technique to filter out the rays travelling in a straight line, while transmitting rays with turbulence induced fluctuations in time. The output is two dimensional, and can provide data regarding the spectral intensity distribution, or a view of the turbulence in real time. The optical monitor of the present invention comprises a laser that produces a coherent output beam that is directed through a fluid flow, which phase-modulates the beam. The beam is applied to a temporal filter that filters out the rays in the beam that are straight, while substantially transmitting the fluctuating, turbulence-induced rays. The temporal filter includes a lens and a photorefractive crystal such as $BaTiO_3$ that is positioned in the converging section of the beam near the focal plane. An imaging system is used to observe the filtered beam. The imaging system may take a photograph, or it may include a real time camera that is connected to a computer. The present invention may be used for many purposes including research and design in aeronautics, hydrodynamics, and combustion.

31613 Cesium iodide alloys. Kim, Hyoun-Ee; Moorhead, A.J. To Dept. of Energy. 1991. USA Patent patent application 7-645,448. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019818. Source: OSTI; NTIS; GPO Dep.

This invention relates to a CsI composition with improved mechanical strength and outstanding multispectral infrared transmittance, for window use. The additive is a monovalent iodide, other than CsI, added in amounts sufficient to maximize fracture strength from 16 to 40 MPa, while maintaining at least 10% transparency in the 4 to 50 micrometer wavelength range. The preferred additive is AgI, although RbI or CuI can be used. 6 figs. (DLC)

4407 Geophysical and Meteorological Instrumentation

Refer also to citation(s) 30861

4408 Miscellaneous Instrumentation

Refer also to citation(s) 30534, 31025, 31300, 31366

31614 (ANL/CP–76870) **Emittance, brilliance, and bandpass issues related to an inclined crystal monochromator.** Macrander, A.T.; Haeffner, D.R.; Cowan, P.L. Argonne National Lab., IL (United States). Jul 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920792–26: SPIE international symposium on optical applied science and engineering, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92019671. Source: OSTI; NTIS; INIS; GPO Dep.

The inclined double crystal monochromator arrangement is very effective in handling high heat loads and holds considerable promise as a monochromator for undulator beams at third generation synchrotrons. Results for the ideal inclined crystal case have been obtained by dynamical diffraction calculations, and diffraction results for the (111) reflection of silicon are presented for an inclination angle of 85°0 and energies of 5 key and 13.84 key. The diffraction characteristics resemble closely diffraction from-asymmetric (111) plane of silicon. However, the inclined and noninclined cases are not identical. Diffraction in the inclined case is slightly different due to refraction. The full width at half maximum of the Darwin-Prins reflectivity curve is slightly increased (~l%), and the angles of the outgoing beam after one reflection are slightly altered. That is, except for a wave incident at the Laue point in reciprocal space, the diffraction is always slightly asymmetric. The effect can be exactly reversed by an identical second crystal in the (+,–) arrangement.

31615 (FRNC-TH–3718) **Thermal pretreatment effect on polycrystalline tin dioxide electrical properties. Application to methane detection.** Vincent, S. Institut National Polytechnique, 38

- Grenoble (France). 3 Feb 1992. 142p. (In French). Order Number DE92566582. Source: OSTI; NTIS (US Sales Only).

The first part is devoted to thermal treatment effect on material morphological characteristics (grain size, porosity...) and on electrical properties in presence of various gases (air, methane, carbon dioxide...). The second part is devoted to the physico-chemical mechanisms understanding of the electrical performances origin.

31616 (JINR-R-10-90-88) **Hardware for research of transition processes in condensed matter with neutron diffraction method.** Barabash, I.P.; Zhironkin, G.F.; Novozhilov, V.E.; Ostrovnoj, A.I.; Shibaev, V.D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1990. 12p. (In Russian). Order Number DE92644546. Source: OSTI; NTIS (US Sales Only); INIS.

The system and electronic units in CAMAC standard for research of transition processes in condensed matter are described. The system allows to register time spectra from a set of detectors as a kit of frames which is placed in sequent parts of the buffer memory unit, implemented as a CAMAC unit. Each frame includes one or more, according to the number of used detectors (up to 32), simultaneously registered time spectra. Time of accumulation of a single frame, number of time channels (from 128 to 4096), capacity of buffer memory (up to 256K), address field of frames (from 256 to 16 K words) are set by computer program or by the switch in the CAMAC unit. Frequency maximum of events registration is 5 MHz. The system is used for research of fast structure transformations in polycrystal samples, for example, in high temperature superconductors. 8 refs.; 6 figs.; 1 tab.

31617. (JINR-R-11-90-141) **Analysis of field space distribution of a spectrometric magnet.** Zhidkov, E.P.; Mazurkevich, G.E.; Khoromskij, B.N.; Yudin, I.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1990. 12p. (In Russian). Order Number DE92644547. Source: OSTI; NTIS (US Sales Only); INIS.

Domain decomposition method with cross-points is used for the numerical analysis of space distribution of the spectrometric magnet field. The calculation of nonlinearity is done using the mesh corresponding to domain partitioning. The solution is found on the essentially smaller grid. The results of numerical analysis are presented. 11 refs.; 6 figs.; 2 tabs.

31618 (JINR-R-13-91-282) **Direct current transducer.** Batmanova, Eh.G.; Kazakova, G.G.; Kalinichenko, V.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 10p. (In Russian). Order Number DE92644548. Source: OSTI; NTIS (US Sales Only); INIS.

A direct current transducer based on magnetic comparison of direct currents is discussed. The principle of operation of the transducer is considered, its blockdiagram, circuit diagram and technical solutions for some of its units are given. General zero drift of the transducer, reduced to the current measured, does not exceed 0.1 A. The output voltage of the transducer is 10 V at the rated value of the current measured. 3 refs.; 7 figs.

31619 (JINR-R-13-91-283) **Hall-effect device of high accuracy.** Ivashkevich, S.A.; Kazakova, G.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 4p. (In Russian). Order Number DE92644549. Source: OSTI; NTIS (US Sales Only); INIS.

Two types of the Hall-effect device circuit for the magnetic field measurements in the range from several hundredth up to units of tesla with the error of 0.01% are described. The characteristics of the parts of the circuit responsible for the measurement accuracy are given. 5 refs.

31620 (PNL-SA-21150) **Fourier transform ion cyclotron resonance precision atomic mass measurement limits.** Kouzes, R.T. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920721-6: 6. international conference on nuclei far from stability and 9th international conference on atomic masses and fundamental constants, Bernkastel-Kues (Germany), 19-24 Jul 1992). Order Number DE92019350. Source: OSTI; NTIS; INIS; GPO Dep.

The application of Fourier Transform Ion Cylcotron Resonance Mass Spectroscopy to precision atomic mass measurements is considered. Limits on the mass accuracy of this technique for atomic masses are discussed, and plans for future developments with application to fundamental weak interaction physics are presented.

45 MILITARY TECHNOLOGY, WEAPONRY, AND NATIONAL DEFENSE

Refer also to citation(s) 31132

31621 (KCP-613-4807) **Pilot process waste assessment for the fireset area.** Cole, M.J.; Goethe, M.C. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019472. Source: OSTI; NTIS; INIS; GPO Dep.

A pilot process waste assessment (WA) was conducted in the fireset area to develop methodology for conducting future process waste assessments. The study was conducted on trichloroethylene spray cleaning using the guidance for PWAs supplied by Environment, Safety, and Health (ES&H). The first objective was to draw up a flow diagram (see Appendix A, worksheet 4) for the process. When this was done, a mass balance (see Appendix A, Worksheet 5) was conducted to determine the quantity of incoming material and where it was going during the process. The mass balance showed that a large quantity of trichloroethylene and all the isopropyl alcohol was being released to the atmosphere instead of being captured in the waste solvent container. Upon completion of the mass balance, waste minimization options where identified (see Appendix A, Worksheet 8) to reduce or eliminate the quantity of hazardous solvent used.

31622 (KCP-613-4810) **Analysis of plasma-treated wire insulation.** Hester, M. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Jul 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019471. Source: OSTI; NTIS; GPO Dep.

A method was developed, and fixtures were built to test the bond strength of wire insulation. Bond strength comparisons were made between dissimilar insulation types to determine how they would respond to potting materials or adhesives after plasma treatment. five different types of insulation were tested for bondability. These wire insulation types were being considered for substitution to improve manufacturability. The results show that all the insulation types responded to the plasma treatment but that polyolefin had higher bonding strength.

31623 (PNL-SA-20626) **Human perceptual deficits as factors in computer interface test and evaluation.** Bowser, S.E. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206237-1: 1992 industrial ergonomics annd safety conference, Denver, CO (United States), 10-14 Jun 1992). Order Number DE92019124. Source: OSTI; NTIS; GPO Dep.

Issues related to testing and evaluating human computer interfaces are usually based on the machine rather than on the human portion of the computer interface. Perceptual characteristics of the expected user are rarely investigated, and interface designers ignore known population perceptual limitations. For these reasons, environmental impacts on the equipment will more likely be defined than will user perceptual characteristics. The investigation of user population characteristics is most often directed toward intellectual abilities and anthropometry. This problem is compounded by the fact that some deficits capabilities tend to be found in higher-than-overall population distribution in some user groups. The test and evaluation community can address the issue from two primary aspects. First, assessing user characteristics should be extended to include tests of perceptual capability. Secondly, interface designs should use multimode information coding.

31624 (PNL-SA-20720) **Quantitative methods for developing C2 system requirement.** Tyler, K.K. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 11p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206239-1: 60. Military Operations Research society symposium, Monterey, CA (United States), 23-25 Jun 1992). Order Number DE92019127. Source: OSTI; NTIS; GPO Dep.

The US Army established the Army Tactical Command and Control System (ATCCS) Experimentation Site (AES) to provide a place where material and combat developers could experiment with command and control systems. The AES conducts fundamental and applied research involving command and control issues using a number of research methods, ranging from large force-level experiments, to controlled laboratory experiments, to studies and analyses. The work summarized in this paper was done by Pacific Northwest Laboratory under task order from the Army Tactical Command and Control System Experimentation Site. The purpose of the task was to develop the functional requirements for army engineer automation and support software, including MCS-ENG. A client, such as an army engineer, has certain needs and requirements of his or her software; these needs must be presented in ways that are readily understandable to the software developer. A requirements analysis then, such as the one described in this paper, is simply the means of communication between those who would use a piece of software and those who would develop it. The analysis from which this paper was derived attempted to bridge the "communications gap" between army combat engineers and software engineers. It sought to derive and state the software needs of army engineers in ways that are meaningful to software engineers. In doing this, it followed a natural sequence of investigation: (1) what does an army engineer do, (2) with which tasks can software help, (3) how much will it cost, and (4) where is the highest payoff? This paper demonstrates how each of these questions was addressed during an analysis of the functional requirements of engineer support software. Systems engineering methods are used in a task analysis and a quantitative scoring method was developed to score responses regarding the feasibility of task automation. The paper discusses the methods used to perform utility and cost-benefits estimates.

31625 (PNL-SA-20954) **Ultra wide band 3-D cross section (RCS) holography.** Collins, H.D.; Hall, T.E. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920799-1: Review of progress in quantitative non destructive evaluation (NDE), La Jolla, CA (United States), 19-24 Jul 1992). Order Number DE92019133. Source: OSTI; NTIS; GPO Dep.

Ultra wide band impulse holography is an exciting new concept for predictive radar cross section (RCS) evaluation employing near-field measurements. Reconstruction of the near-field hologram data maps the target's scattering areas, and uniquely identifies the "hot spot" locations on the target. In addition, the target and calibration sphere's plane wave angular spectrums are computed (via digital algorithm) and used to generate the target's far-field RCS values in three dimensions for each frequency component in the impulse. Thin and thick targets are defined in terms of their near-field amplitude variations in range. Range gating and computer holographic techniques are applied to correct these variations. Preliminary experimental results on various targets verify the concept of RCS holography. The unique 3-D presentation (i.e., typically containing 524,288 RCS values for a 1024 x 512 sampled aperture for every frequency component) illustrates the efficacy of target recognition in terms of its far-field plane wave angular spectrum image. RCS images can then be viewed at different angles for target recognition, etc.

31626 (SAND-88-0018-Rev.) **Software overview for the Annunciator Communication System: Interim report: Revision.** Doerfler, D.W. (Sandia National Labs., Albuquerque, NM (United States)); Fox, E.T. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92018931. Source: OSTI; NTIS; GPO Dep.

An overview of the software for the Annunciator Communication System, an interior/exterior alarm communication system, is provided. We describe the purpose of each module, and how the modules are tied together. In addition, a description of the software development environment is provided. Software topics include software specifications, software development environment, task definitions task communications, and software generation. Hardware topics include environment on which the software was developed, hardware dependencies, and firmware (software target environment) specifications.

31627 (SAND-91-2768C) **A smoke producing rocket motor for atmospheric wind profiling.** Grubelich, M.C. (Sandia National Labs., Albuquerque, NM (United States)); Rowland, J. Sandia National Labs., Albuquerque, NM (United States). [1991]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9204190-1: Smoke and obscurants symposium, Laurel, MD (United States), 14-16 Apr 1992). Order Number DE92018264. Source: OSTI; NTIS; GPO Dep.

A composite propellant was developed to produce a dense plume from a rocket motor. The development of this propellant combined the smoke producing capabilities of a smoke generator with a rocket motor, thereby integrating the separate systems into one unit. A rocket motor was designed for use with this propellant to produce a high density particulate plume. This plume could then be used to determine the wind profile in the atmosphere by using a light detection and ranging system. Additionally, this smoke producing propellant could be used for rapid screening or identification. The burn rate characteristics of the propellant were measured and static firings of rocket motors were conducted to determine the performance of the propellant. The results of these tests will be presented as well as theoretical performance predictions of a flight vehicle.

31628 (SAND-92-0579C) **Neural network sensor fusion for security applications.** Frank, D.; Pletta, J.B. Sandia National Labs., Albuquerque, NM (United States). [1992]. 18p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921185-1: 1992 artificial neural networks in engineering conference, St. Louis, MO (United States), 15-18 Nov 1992). Order Number DE92017056. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Neural networks can detect patterns in information that they receive and have been used successfully in many classification problems. The research discussed in this paper was pursued to determine if neural networks could be successfully used for alarm classification for security systems operating in unstructured environments. This project investigated the usefulness of various types of neural networks for this application. They included back-propagation, Delta-Bar-Delta, Directed Random Search, Adaptive teaming Networks, and Learning Vector Quantization networks. The results from the research exceeded the original goals, promising sound application to security systems in unstructured environments.

31629 (UCRL-ID-110629) **Radio pill antenna range test.** Cummins, W.F.; Kane, R.J. Lawrence Livermore National Lab., CA (United States). May 1992. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019903. Source: OSTI; NTIS (US Sales Only); GPO Dep.

In order to investigate the potential of a proposed "radio pill" beacon transmitter, a range test experiment was devised and carried. out in the VHF frequency range. Calculations and previous work indicated that optimum sensitivity and, thus, distance would be obtained in this frequency range provided body radio-frequency (rf) absorption was not too great. A ferrite-core loop antenna is compatible with a pill geometry and has better radiation efficiency than an air core loop. The ferrite core may be a hollow cylinder with the electronics and batteries placed inside. However, this range test was only concerned with experimentally developing test range data on the ferrite core antenna itself. A one turn strap loop was placed around a 9.5 mm diameter by 18.3 mm long stack of ferrite cores. This was coupled to a 50 Ω transmission line by 76 mm of twisted pair line and a capacitive matching section. This assembly was excited by a signal generator at output levels of −10 to +10 dBm. Signals were received on a VHF receiver and tape recorder coupled to a 14 element, circularly polarized Yagi antenna at a height of 2.5 m. Field strength measurements taken at ranges of 440, 1100, and 1714 m. Maximum field strengths referenced to 0 dBm transmitter level were −107 to −110 dB at 440 m, −124 to −127 dBm at 1100 m, and −116 to −119 dBm at 1714 m when the antenna cylinder was horizontal. Field strengths with a vertical antenna were about 6 dB below these values. The latter transmit site was elevated and a had clear line-of-site path to the receiving site. The performance of this test antenna was better than that expected from method-of-moment field calculations. When this performance data is scaled to a narrow bandwidth receiving system, ground level receiving ranges of a few to 10 km can be expected. Clear line-of-sight ranges where either or both the transmitter and receiver are elevated could vary from several km to 100 km.

4501 Chemical Explosions and Explosives

Refer also to citation(s) 31686

31630 (LA-UR--92-2378) **Destruction of explosives and rocket fuels by supercritical water oxidation.** Dyer, R.B. (Los Alamos National Lab., NM (United States)); Buelow, S.J.; Harradine, D.M.; Robinson, J.M.; Foy, B.R.; Atencio, J.H.; Dell'Orco, P.C.; Funk, K.A.; McInroy, R.E.; Rofer, C.K.; Counce, D.A.; Trujillo, P.E. Jr.; Wander, J.D. Los Alamos National Lab., NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206231--1: 16. annual army environmental R&D symposium, Williamsburg, VA (United States), 23-25 Jun 1992). Order Number DE92018874. Source: OSTI; NTIS; GPO Dep.

Traditional methods for disposing of PEPs have been open burning or open detonation (OB/OD); however, regulatory agencies are likely to prohibit OB/OD because of the uncontrolled air emissions and soil contaminations. Likewise, controlled incineration carries a liability for air pollution because large quantities of NO_x are produced in the conventional combustion chemistry of PEPS. Soil and ground water have already been contaminated with PEPs through normal operations at manufacturing plants and military bases. Incineration can be used for decontamination of these soils, with the associated liability for air pollution, but few satisfactory and economic methods exist for ground water decontamination. A clear need exists for improved disposal and destruction methods. The destruction of energetic materials, including propellants, explosives and pyrotechnics (PEPS) by oxidation in supercritical water is described. The focus is on the chemistry of the process. The destruction efficiencies and products of reaction contained in the aqueous and gaseous effluents of several representative PEPs are reported.

31631 (LA-UR--92-2388) **Detonation reactions frozen by free expansion and analyzed by mass spectrometry.** Greiner, N.R.; Fry, H.A.; Blais, N.C. Los Alamos National Lab., NM (United States). [1992]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206226--1: 11. annual working group institute on synthesis of high energy density materials, Monticello, NY (United States), 8-11 Jun 1992). Order Number DE92018605. Source: OSTI; NTIS; GPO Dep.

The molecular design of new more powerful and less sensitive explosives requires detailed knowledge of reaction mechanisms and compositions of molecular products from explosives having a variety of molecular structures and performance parameters. We describe a new apparatus and method for analyzing detonation reactions using 30–250 mg charges. The apparatus consists of a TOF mass spectrometer interfaced to a high-vacuum firing chamber through a skimmer and a laser-schlieren optical system. The fireball normally produced by a detonation is frozen sequentially from the outside inward in a continuum of stages by free adiabatic expansion into the vacuum. Expansion of a given volume element begins when the rarefaction wave arrives from the free surface of the charge, and we find that no significant mixing occurs during the expansion. In this way the chemical history of the detonation is frozen in time and imprinted on the structure of the expanding frozen fireball. Our apparatus isolates a core sample from the expanding fireball as an undisturbed molecular beam and provides a series of mass spectra derived from successive segments of the core. The assembled data set from each pellet fired is a sequence of 95 mass spectra that characterizes the molecules resistant to change at a succession of times separated by a few (ns) in the detonation reaction. These molecules are associated with the slower (rate-determining) steps or stable products in the reaction sequence and give valuable clues to reaction mechanisms. Our mass spectrometer automatically records expansion velocities of the core segments, and an electronic framing camera concurrently records a sequences of laser-schlieren images of the detonation and expansion. The number of spectra over which a change is observed can be related, through the hydrodynamics of the detonation and expansion, to the rate of that change in the detonating sample.

31632 (MLM--3757(OP)) **Development of a laser ignited all secondary explosive DDT detonator.** Woods, C.M.; Spangler, E.M.; Beckman, T.M.; Kramer, D.P. EG and G Mound Applied Technologies, Miamisburg, OH (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-88DP43495. (CONF-920796--7: 18. international pyrotechnics seminar, Breckenridge, CO (United States), 13-17 Jul 1992). Order Number DE92019340. Source: OSTI; NTIS; GPO Dep.

A hermetic, stand alone, laser-ignited deflagration-to-detonation transition (DDT) detonator has been developed. The detonator uses the secondary explosive HMX (cyclotetramethylenetetranitramine) and was originally developed for use with the US Navy's Laser Initiated Transfer Energy subsystem (LITES). The design of the new detonator allows for its use with a variety of laser fire sets. A high density blend 6f 830 cm2/g HMX with 3% carbon black by weight was used for the ignition charge. Deflagration-to-detonation transition was achieved with a transition charge of undoped 830 cm2/g HMX. Using a 12-ms ND-YAG laser pulse coupled to the detonator via a 1-mm diameter optical fiber, the ignition threshold was determined to be approximately 30 mJ. Full detonating outputs were demonstrated by function testing in Navy detonation sensitivity fittings. Finally, the detonator was tested in several configurations with shielded mild detonating chord (SNMC) endrips to determine its capability for lighting transfer lines.

31633 (MLM--3758(OP)) **Hot-wire vs laser, is there a difference?.** Munger, A.C.; Beckman, T.M.; Kramer, D.P. Mound, Miamisburg, OH (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-88DP43495. (CONF-920796--8: 18. international pyrotechnics seminar, Breckenridge, CO (United States), 13-17 Jul 1992). Order Number DE92019337. Source: OSTI; NTIS; GPO Dep.

When a design for an ordnance device utilizing new technology begins to take shape all of the various design elements are approached individually and then ultimately tested as a single system. This approach allows the various elements to float within an overall design envelope. The embracing of laser technology for the ignition system of various ordnance designs should ideally take this path. The reality for many of us is that the total system will not be completely re-engineered. The laser ignition system will need to be integrated into existing systems. This will require innovative electrical to laser interfaces and also require that the physical output of the new device duplicate that of the replaced electrical devices. This seems like a given when the technology is examined; after all, both hot-wire technology and laser technology provide energy to effect ignition of the energetic material and should have no influence on the burning characteristics. This statement appears to be the "truth" but when asked to produce any evidence to support the contention, we at Mound had none. This paper will report on some experiments that were conducted to begin building the data base that supports this hypothesis.

31634 (SAND--91-2804C) **Optimization of a VISAR for measuring flyer-plate velocities.** Sweatt, W.C.; Crump, O.B. Jr.; Brigham, W.P. Sandia National Labs., Albuquerque, NM (United States). 2 Jun 1992. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920792--4: SPIE international symposium on optical applied science and engineering, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92040942. Source: OSTI; NTIS; GPO Dep.

A VISAR (velocity interferometer) has been built to track flyer plates over a 1-mm travel. The laser, target, and cavity are fiber-coupled, and the signal collection is maximized.

31635 (SAND–92-0482) **Nonideal thermoequilibrium calculations using a large product species data base.** Hobbs, M.L.; Baer, M.R. Sandia National Labs., Albuquerque, NM (United States). Jun 1992. 127p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92040839. Source: OSTI; NTIS; GPO Dep.

Thermochemical data fits for approximately 900 gaseous and 600 condensed species found in the JANAF tables (Chase et al., 1985) have been completed for use with the TIGER nonideal thermoequilibrium code (Cowperthwaite and Zwisler, 1973). The TIGER code has been modified to allow systems containing up to 400 gaseous and 100 condensed constituents composed of up to 50 elements. Gaseous covolumes have been estimated following the procedure outlined by Mader (1979) using estimates of van der Waals radii for 48 elements and three-dimensional molecular mechanics. Molecular structures for all gaseous components were explicitly defined in terms of atomic coordinates in Å. The Becker-Kistiakowsky-Wilson equation of state (BKW-EOS) has been calibrated near C-J states using detonation temperatures measured in liquid and solid explosives and a large product species data base. Detonation temperatures for liquid and solid explosives were predicted adequately with a single set of BKW parameters. Values for the empirical BKW constants α, β, k, and θ were 0.5, 0.174, 11.85, and 5160, respectively. Values for the covolume factors, k_i, were assumed to be invariant. The liquid explosives included mixtures of hydrazine nitrate with hydrazine, hydrazine hydrate, and water; mixtures of tetranitromethane with nitromethane; liquid isomers ethyl nitrate and 2-nitroethanol; and nitroglycerine. The solid explosives included HMX, RDX, PETN, Tetryl, and TNT. Color contour plots of HMX equilibrium products as well as thermodynamic variables are shown in pressure and temperature space. Similar plots for a pyrotechnic reaction composed of TiH_2 and $KC1O_4$ are also reported. Calculations for a typical HMX-based propellant are also discussed.

4502 Nuclear Explosions and Explosives

Refer also to citation(s) 31364, 31633, 31693

31636 (LA–12348) **Advanced high-explosive flux compression generator development: The CN-III series.** Freeman, B.L.; Sheppard, M.G.; Fowler, C.M. Los Alamos National Lab., NM (United States). Aug 1992. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019962. Source: OSTI; NTIS; GPO Dep.

A very successful series of three flux compression generator (FCG) experiments and one hydro-only test, designed to quantify the performance capabilities and limitations of high-current, high-field, high-power coaxial FCGs, is reported. In the last test, the CN-III FCG produced a peak current of >150 MA with a final doubling time of <10μs into a 2-nH inductive load. Experimental results are in excellent agreement with extensive preshot and postshot one-dimensional (1D) and two-dimensional (2D) magnetohydrodynamic (MHD) calculations.

31637 (LA-UR–92-1783) **Approximating the r-process on earth with thermonuclear explosions.** Becker, S.A. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206249–1: Origin & evolution of the elements conference, Paris (France), 22-25 Jun 1992). Order Number DE92017409. Source: OSTI; NTIS; INIS; GPO Dep.

The astrophysical r-process can be approximately simulated in certain types of thermonuclear explosions. Between 1952 and 1969 twenty-three nuclear tests were fielded by the United States which had as one of their objectives the production of heavy transuranic elements. Of these tests, fifteen were at least partially successful. Some of these shots were conducted under the project Plowshare Peaceful Nuclear Explosion Program as scientific research experiments. A review of the program, target nuclei used, and heavy element yields achieved, will be presented as well as discussion of plans for a new experiment in a future nuclear test.

31638 (LA-UR–92-1980) **Supercritical CO_2 cleaning for waste minimization.** Williams, J.M.; Bongianni, W.L. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206231–2: 16. annual army environmental R&D symposium, Williamsburg, VA (United States), 23-25 Jun 1992). Order Number DE92017507. Source: OSTI; NTIS; GPO Dep.

Production facilities in the US Department of Energy complex employ a variety of solvent-based cleaning methods for removing residues that might after the manufacturing process, corrosion chemistry or function of weapons components. Many of the solvents are hazardous chemicals such as volatile organic compounds. Some are chlorocarbons and chlorafluorocarbons that are environmentally unacceptable, generate hazardous waste and are subject to existing or impending regulation. Supercritical CO_2 is a moderately good solvent for organic compounds. It also appears to satisfy environmental criteria not met by chlorofluorocarbon solvents in use. Supercritical conditions are attained at modest conditions. The high volatility of $C0_2$ facilitates solute separation and the likelihood of solvent recycle. $C0_2$ is economical, naturally occurring, non toxic, unreactive and poses minimal ES&H risk. Supercritical $C0_2$ technology is well developed and widely used for extracting organic compounds in food, polymer, pharmaceutical and synfuel industries. Large-scale supercritical fluid systems are commercially available for extraction, but only recently have several US companies begun to design and build units for cleaning. The objective of this supercritical fluid $C0_2$ program at Los Alamos National Laboratory is to develop supercritical fluid carbon dioxide as a recyclable, non hazardous solvent for cleaning some weapons components. Prior studies at DOE's Rocky Flats Plant show that organic residues on steel and uranium surfaces cleaned with supercritical $C0_2$ and with 111-trichloroethane are comparable. Recent vendor tests show that large steel objects can be cleaned at easily accessible temperatures, pressures, flow rates and times to levels that are a hundred-fold cleaner than that required for plutonium weapons components. A description of the technology, some of our data, and our planned scale-up activities are presented herein.

31639 (SAND–90-0351) **Lightning threat warning system at the Tonopah Test Range.** Smith, R. Sandia National Labs., Albuquerque, NM (United States). Jul 1992. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE92040444. Source: OSTI; NTIS; GPO Dep.

This report documents the lightning threat warning system at the Tonopah Test Range and the technology it uses. The report outlines each of the system's individual components and the information each contributes.

31640 (SAND–92-1775C) **Automated dry powder dispenser for explosive components.** Garcia, P. (Sandia National Labs., Albuquerque, NM (United States)); Salmonson, J.C. Sandia National Labs., Albuquerque, NM (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9209171–2: JOWOG 39F and SUBWOG F-Robotics joint meeting, Monterey, CA (United States), 14-18 Sep 1992). Order Number DE92019425. Source: OSTI; NTIS; GPO Dep.

Sandia and Mound are developing a workcell that will automate the assembly of explosive components. Sandia is responsible for the automated powder dispenser subsystem. Automated dispensing of explosive powders in the past resulted in separation or segregation of powder constituents. The Automated Dry Powder Dispenser designed by Sandia achieves weight tolerances of ±0.1 mg while keeping powderoxidizer separation to a minimum. A software control algorithm compensates fore changes in powder flow due to lot variations, temperature, humidity, and the amount of powder left in the system.

31641 (UCRL-JC–109645) **Sensitivities of calculated residual stress to separation distances of two simultaneous events.** Rambo, J.T.; Moss, W.C. Lawrence Livermore National Lab., CA

(United States). Feb 1992. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9109114–12: 6. symposium on containment of underground nuclear explosions, Reno, NV (United States), 24-26 Sep 1991). Order Number DE92019571. Source: OSTI; NTIS (US Sales Only); GPO Dep.

LLNL has developed calculational capabilities to model simultaneous explosions of different yields with DYNA2D. Past experimental experience suggests that double events are contained when the work points are separated by no less than twice the sum of the final radii of the two cavities with the higher yield device buried at a safe depth and above the lower yield device. In the past, this non-optimal use of the drill hole was chosen to ensure safe containment and to provide cost savings. Although additional savings can be realized by placing the lower yield device above the higher yield device, there is no really relevant experimental experience. Given current and projected funding levels for the nuclear testing program, study (calculationally) of the feasibility of a low-over-high emplacement could make possible significant savings. In this study we examine the sensitivity of the residual stress field to work point separation for a one kiloton device placed above a ten kiloton device. The geometry is cylindrically symmetric. Work point separations were varied between 50 and 300 m. The depth of burial for the upper device was fixed at 270 m so that overburden would not be a sensitivity factor in the residual stress calculation. Results show that unanticipated weaknesses in the residual stress of the lower yield device occur at some work point separations.

4503 Nuclear Explosion Detection

Refer also to citation(s) 32017

4506 Chemical and Biological

31642 (ORNL/TM–12002) **Protocol for determination of chemical warfare agent simulant movement through porous media.** Jenkins, R.A.; Buchanan, M.V.; Merriweather, R.; Ilgner, R.H.; Gayle, T.M.; Moneyhun, J.H.; Watson, A.P. Oak Ridge National Lab., TN (United States). Jul 1992. 19p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019932. Source: OSTI; NTIS; GPO Dep.

In the event of an unplanned release of chemical warfare agent during any phase of the Chemical Stockpile Disposal Program (CSDP), a (small) potential exists for contamination of buildings and materials used in their construction. Guidelines for unrestricted access to potentially agent-contaminated private and public property are presently undefined due to uncertainties regarding the adequacy of decontaminating porous surfaces such as wood, masonry and gypsum wall board. Persistent agents such as VX or mustard are particularly problematic. The report which follows documents a measurement protocol developed in a scoping investigation characterizing the permeation of chemical warfare agent simulants [diisopropylmethyl phosphonate (DIMP) for warfare agent GB, dimethylmethyl phosphonate (DMMP) for warfare agent VX and chlorethylethyl sulfide (CEES) for warfare agent sulfur mustard] through several, common porous, construction materials. The "porous media" selected for examination were wood, brick, cinder block, and gypsum wall board. Simulants were tested rather than actual warfare agents because of their low toxicity, commercial availability, and the lack of surety capability at Oak Ridge National Laboratory (ORNL). The present work is considered a protocol for confirmation testing with "live" agents.

54 ENVIRONMENTAL SCIENCES

31643 (KVM–28) **The environmental year 1991.** KVM, the Joint Committee of Power and Heating Producers on Environmental Issues, Stockholm (Sweden). 1992. 15p. (In Swedish). Order Number DE92563046. Source: OSTI; NTIS.

This annual report from the Swedish Power and Heat Producers Coordination Committee for Environmental Issues gives a brief review of urgent environmental problems, such as acidification, ozone and VOC levels, waste management, and the global climatic change. Activities sponsored by KVM during 1991 are also noted.

5401 Environmental Sciences, Atmospheric

Refer also to citation(s) 30475, 30476, 30477, 30478, 30479, 30480, 30481, 30482, 30484, 30485, 30486, 30614, 30703, 30755, 30757, 30761, 30813, 31069, 31131, 31133, 31187, 31307, 31621, 31687, 31693, 31912, 31999, 32515, 32535, 32543, 32545

31644 (CNIC–00496) **Improved thomas formula for radon measurement.** Ji Changsong (Beijing Nuclear Instrument Factory, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China). Jun 1991. 14p. (In Chinese). (BNIF–0005.). Order Number DE93601521. Source: OSTI; NTIS (US Sales Only); INIS.

The FT 648 type portable absolute radon meter has been developed and the designing principle of this instrument is introduced. The absolute radon meter differs from relative radon meter. By using structure parameters, operating parameters and readout of this instrument, the radon content of measured gas is obtained directly without calibration in advance. Normally, the calibration is done by a standard radioactive gaseous source of which the radon concentration is known. The systematic error is removed by adding filter-efficiency Σ, α self-absorption correction β, energy spectrum correction S, geometric factor Ω of probe and gravity dropping correction factor G to the Thomas formula for radon measurement of two-filter method. The atmosphere radon content, which is given in hour-average, in Beijing area was measured by FT 648 type absolute radon meter. The measurement lasted continuously for several days and nights and a 'saddle shape' of radon content-time curve was observed. The day's average radon content was 8.5 Bq·m^{-3}.

31645 (DOE/ER/13771–1) **Bacterially induced precipitation of CaCO$_3$: An example from studies of cyanobacterial mats: Final report.** Chafetz, H.S. Texas Univ., Houston, TX (United States). 30 Apr 1990. 174p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-87ER13771. Order Number DE92019050. Source: OSTI; NTIS; GPO Dep.

Contains thesis by Chris Buczynski: Characteristics of bacterially induced precipitates of calcium carbonate from the laboratory, and from cyanobacterial mats of Baffin Bay, Texas, and Andros Island, Bahamas.

Bacteria induce the precipitation of calcium carbonate in the laboratory and in nature by altering their chemical environment. Geologists are recognizing the possibility that bacterially induced precipitates may form significant mineral deposits, unfortunately, there are currently no sound criteria by which they can be recognized in recent sediments, or in the rock record. Cultures of aerobic and facultative bacteria from cyanobacterial mats on Andros Island, Bahamas, and Baffin Bay, Texas, induced the precipitation of calcium carbonate under controlled conditions. Crusts, the largest features formed, are composed of 5–200μm diameter bundles which are, in turn, composed of numerous individual crystals. The smallest observed features are 0.1–0.4μm spheres and rods which comprise some individual crystals and crystal bundles. Crystal bundles resembling rhombohedra, tetragonal disphenoids, tetragonal dipyramids, and calcite dumbbells appear to be uniquely bacterial in origin, and they have all been observed in recent sediments. Swollen rods, discs, curved dumbbells, and 50–200μm optically continuous crystals resembling brushes may be uniquely bacterial in origin, however, they have not been reported by other laboratories nor observed in natural settings. Presence of any of these forms in recent sediments should be taken as strong evidence for bacterial influence. Spheres and aragonite dumbbells have also been observed in natural environments, however, they are not always bacterial in origin. Precipitation of calcium carbonate occurs preferentially on dead cyanobacteria in the presence of bacteria. Lithification of algal mats to form stromatolites may take place in the zone of decaying organic matter due to bacterial activity.

31646 (DOE/ER/69027–3) **Studies of the role of clouds in CO$_2$-induced climate change: Progress report, September 15, 1991–September 14, 1992.** Randall, D.A. Colorado State Univ., Fort Collins, CO (United States). Dept. of Atmospheric Science. Jul 1992. 13p. Sponsored by USDOE, Washington, DC (United

States). DOE Contract FG02-89ER69027. Order Number DE92018648. Source: OSTI; NTIS; GPO Dep.

Predictions of global change based on climate models are influencing both national and international policies on energy and the environment. Existing climate models show some skill in simulating the present climate, but suffer from many widely acknowledged deficiencies. Among the most serious problems is the need to apply "flux corrections" to prevent the models from drifting away from the observed climate in control runs that do not include external perturbing influences such as increased carbon dioxide (CO_2) concentrations. The flux corrections required to prevent climate drift are typically comparable in magnitude to the observed fluxes themselves. During the past three years, we have conducted a research program designed to investigate global air-sea interaction as it relates to the global warming problem, with special emphasizing the role of clouds. Our research includes model development efforts; application of models to simulation of present and future climates, with comparison to observations wherever possible; and vigorous participation in ongoing efforts to intercompare the present generation of atmospheric general circulation models.

31647 (DTH-LFK-F–159-01) **CFC environmental problems and cooling technology.** Hornung, M.O. Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Koeleteknik. Aug 1991. 108p. (In Danish). Order Number DE92562847. Source: OSTI; NTIS; INIS.

The aim of the report is to provide a broad survey of the technological problems imposed on the production of cooling systems by the demands for reduction in the use of chlorofluorocarbons as refrigerants. With regard to industrial research in this area the present situation is clarified and possible future developments are discussed. The influence of CFC gasses on the global environment and international and national legislation within this field are explained. Alternative refrigerants and cooling processes, and ways of reducing refrigerant leakage, are described. It is concluded that currently the use of alternative refrigerants is the policy which is generally accepted, and intensive research is being carried out in this field. R134a should substitute R12 in the cases of household refrigerators and air conditioning, and will soon be commercially available. The use of R22 and ammonia will be extended. This is a practical policy to follow up commercially, whereas the policy of alternative processes presents more problems because they are not so developed and there is less available know-how in this area. The possibilities for hermetic sealing of cooling systems are unrealistic and should anyway be regarded only as a supplement to alternative refrigerants. Within the European Community it is intended to provide standards and regulations in relation to air pollution from refrigerants. (AB) (58 refs.).

31648 (EGG-WTD–10320) **Test plan for air monitoring during the Cryogenic Retrieval Demonstration.** Yokuda, E. EG and G Idaho, Inc., Idaho Falls, ID (United States). Jun 1992. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019770. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents a test plan for air monitoring during the Cryogenic Retrieval Demonstration (CRD). Air monitors will be used to sample for the tracer elements neodymium, terbium, and ytterbium, and dysprosium. The results from this air monitoring will be used to determine if the CRD is successful in controlling dust and minimizing contamination. Procedures and equipment specifications for the test are included.

31649 (HMI-B–495) **Realization of a Lagrange-simulation model for dispersion calculations.** Gottwald, S. Hahn-Meitner-Institut Berlin GmbH (Germany). Bereich Datenverarbeitung und Elektronik. Sep 1991. 60p. (In German). Order Number DE93702331. Source: OSTI; NTIS (US Sales Only); INIS.

In addition to the installation of a new radiation control and monitor system an extensive software system was developed to compute the dispersion of radioactive substances in the atmosphere. This report presents a detailed description of the dispersion model based on a Lagrangian random walk model and its implementation on a massive parallel machine (transputer cluster). Considerations and tests about efficiency and validation are given. (orig.).

31650 (INIS-mf–13334, pp. 120-120d) **Rn gas level as an indicator to the radiological impact of Rn progeny.** Margaliot, M. (Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center); Schlesinger, T.; Kazir, A. Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering. May 1992. 146p. (CONF-9205231–: 17. Nuclear Societies of Israel workshop on long-baseline neutrino oscillations, Beer Sheva (Israel), 4 May 1992). In *Proceedings of the 17th conference of the Nuclear Societies of Israel.* Order Number DE92642284. Source: OSTI; NTIS (US Sales Only); INIS.

In the following, it is suggested that in spite of the irrefuteable radiological role of the radon progeny, the radon gas level serves, practically, as a better indicator to the radiological respiratory health hazards, then does the measured radon progeny level itself. This suggestion is based on the evaluation of the information produced by commercially available Rn progeny meters, and of the radiological significance of the unattached fraction of the Rn progeny. (author).

31651 (INIS-mf–13347, pp. 5) **Long term measurements of WL-levels in metal mines by using the ASS-system and HCS-system.** Domanski, T. (Institute of Occupational Medicine (Poland)); Chruscielewski, W. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/personnel dosimetry; AIR SAMPLERS; MINERS; MINES; RADIATION DETECTORS; RADON

31652 (INIS-mf–13347, pp. 19-20) **Radon concentrations in air of Polish underground coal mines.** Chruscielewski, W. (Institute of Occupational Medicine (Poland)); Zorawski, A.; Olszewski, J.; Domanski, T. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/radioecological concentration; POLAND/coal mines; EMANOMETERS; RADON; UNDERGROUND MINING; POLAND

31653 (INIS-mf–13347, pp. 21-22) **Radiation monitoring program in Italian non-uranium mines.** Sciocchetti, G. (ENEA, Rome (Italy)); Scacco, F.; Baldassini, P.G.; Sarao, R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINES/radiation monitoring; ALPHA DOSIMETRY; DAUGHTER PRODUCTS; EMANOMETERS; ITALY; MINES; RADON 222

31654 (INIS-mf–13347, pp. 31) **Measurements of radon and decay products in non-uranium mines of the Federal Republic of Germany using active and passive methods.** Kompa, R. (Bundesgesundheitsamt, Berlin (Germany). Inst. fuer Strahlenhygiene); Pensko, J.; Schmier, H. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINES/radiation monitoring; DAUGHTER PRODUCTS; FEDERAL REPUBLIC OF GERMANY; MINES; RADIATION DOSES; RADON 222; VENTILATION

31655 (INIS-mf–13347, pp. 34) **Computer modeling of airborne alpha radiation in mines.** Notley, K.R. (Queen's Univ., Kingston, ON (Canada). Dept. of Mining Engineering); Wheeler, A.J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In

Abstracts of the International Conference on Occupational Radiation Safety in Mining. Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. VENTILATION/computerized simulation; AIR; DAUGHTER PRODUCTS; MINES; RADON 222; V CODES; VENTILATION

31656 (INIS-mf--13347, pp. 41-42) **Electrical properties of radon daughters.** Jonassen, N. (Technical University of Denmark, Lyngby (Denmark). Lab. of Applied Physics 1). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/electrostatic precipitators; DAUGHTER PRODUCTS; DEPOSITION; ELECTRIC FIELDS; IONS

31657 (INIS-mf--13347, pp. 45) **Thoron daughter to radon daughter ratios in mines.** Stranden, E. (Statens Inst. for Straalehygiene, Oslo (Norway)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501--: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 220/mines; DAUGHTER PRODUCTS; NORWAY; QUANTITY RATIO; MINES; RADON 222

31658 (INIS-mf--14082) **Project: Radiological assessment of the southern region of East Germany. Natural radioactivity. Long-standing land pollution from mining activities. Radon activity. Management of long-standing land pollution. Database establishment. Radiological assessment. Participation and information of the public.** Bundesamt fuer Strahlenschutz, Salzgitter (Germany). Nov 1991 12p. (In German). Order Number DE93702338. Source: OSTI; NTIS (US Sales Only); INIS.

On the basis of data obtained by remote sensing, or available from former local measurements, areas of suspected radioactive contamination have been determined in the East German lands of Sachsen, Thueringen and Sachsen-Anhalt. These areas amount to a surface area of 1400 km^2 all in all. The radiological situation in these areas has to be ascertained, in particular the environmental contamination resulting from mining activities and from the radon inventory. Waste management and regional rehabilitation are activities that have to be planned and carried out subject to the laws providing for participation of the public. (DG).

31659 (IVL-B--1048) **A comparison of different chemical models for use in regional simulations of air pollution.** Pleijel, K.; Andersson-Skoeld, Y. Swedish Environmental Research Inst., Goeteborg (Sweden). Feb 1992. 45p. (In Swedish). Order Number DE92563036. Source: OSTI; NTIS.

Four different models for predicting photochemical oxidant formation, using different chemical simplifications, have been compared to a more complete and detailed model. Weather data for the growing season, and emission data for southern Sweden was used as a standard input for the calculations. The results were also compared using the input data with only half of the Swedish emissions of NO$_x$ and VOC. The simulated concentrations of ozone, volatile organic compounds, peroxyacethylnitrate (PAN), hydrogen peroxide, nitrogen oxides, nitric acid, hydroxyl radicale and formaldehyde have been compared during 48 hours. No significant differences between the models occurred for the simulated NO$_x$, HNO$_3$ and O$_3$ profiles, although large deviations were noted for the H$_2$O$_2$ and PAN simulations. These discrepancies can be attributed to the different reaction pathways used for VOC decomposition. A 50% NO$_x$ reduction in the input data, related to a decrease in the ozone concentrations of up to 6-10%, while the PAN levels decreased by 11-27%. Similarly, the model results using a halved VOC emission as input, showed a maximum ozone reduction of 2-6% and a maximum PAN reduction of 15-19%. The largest decreases in ozone and PAN were observed in a 50% emission reduction of both NO$_x$ and VOC. In this case the maximum ozone decrease was 8-13% and the corresponding PAN decrease was 27-36%. 44 refs., 20 figs, 5 tabs.

31660 (IVL-B--1056) **The importance of chemical and meteorological processes in the atmosphere for meso-scale ozone formation.** Pleijel, K.; Andersson-Skoeld, Y.; Omstedt, G. Swedish Environmental Research Inst., Goeteborg (Sweden). 1992. 91p. (In Swedish). Order Number DE92563088. Source: OSTI; NTIS.

In this report, different factors behind ozone formation were studied using an atmospheric trajectory model. The effect of chemical and meteorological factors on local to meso-scale ozone formation for up to ca two days transport time included: sunlight, temperature, mixing, the chemical composition of the background air (coming from outside the country), nitrogen oxides, and organic compounds as a group and as individual compounds. While sunlight, mixing and the chemical composition of the background air play a major role in ozone formation, temperature plays a much smaller role. Nitrogen oxides are as a group more important than organic compounds for ozone formation in the Swedish cases that is studied here. Concerning individual organic compounds, they are compared with one another by using ozone building potentials expressed as kg ozone formed per kg emitted organic compound. We also discuss the relevance of non-photolytic and marine initiated breakdown of hydrocarbons as an additional factor contributing to ozone formation. This factor is thus far very uncertain, and in the calculated examples contributes only a small amount to ozone formation. Finally, several typical examples give a realistic picture as to how different chemical and physical conditions during different seasons can affedt ozone building on a meso-scale in Sweden. 48 refs., 35 figs., 20 tabs.

31661 (LA-UR--92-2212) **Tributary and gap nighttime air flow comparisons.** Porch, W.M. Los Alamos National Lab., NM (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209163--1: 6. American Meteorological Society conference on mountain meteorology, Portland, OR (United States), 29 Sep - 2 oct 1992). Order Number DE92018875. Source: OSTI; NTIS; GPO Dep.

Air flow studies in valleys at night have led to the concept of a drainage flow related to the "air shed" area defined by ridge lines surrounding the valley (e.g. Clements et al., 1989). The concept of an "air shed" , when taken to an illogical extreme, would imply extreme drainage flows in a valley surrounded by a very large nearly f at ridge slope. A hypothesis to be tested is that, because of water erosion of gently sloping land surfaces into tributaries, the concept of an "air shed" is really equivalent to saying that the drainage flow in a valley at night is mainly related to the number and size of tributaries feeding the main valley. Why is this distinction important? Because, if tributaries are dominating the valley drainage flow, it is important to place pollution sources so that their plumes avoid major tributaries rather than gentle ridge slopes. An experiment was conducted in to study the relationship between nighttime winds down the Tennessee Valley (northeast to southwest) and flow out of a gap between one valley containing the city of Oak Ridge and another valley (Bear Creek Valley) containing the oak Ridge radioactive material processing facility Y-12 (Scarboro Gap). Optical cross-path wind sensors were used across the main valley and gap. The cross-valley optical paths measured a component of the cross-valley wind. Wind direction measurements at three levels (10,30 and 100 a) from a meteorological tower near the center of the valley path was used to determine the long term (1 hour average) effect of cross valley winds.

31662 (LA-UR--92-2425) **Innovative technologies for removing toxic compounds from groundwater and air.** Rosocha, L.A.; Allen, G.R.; Anderson, G.K.; Bechtold, L.A.; Coogan, J.J.; Heck, H.G.; Kang, M.; McCulla, W.H.; Secker, D.A.; Smith, J.D.; Tennant, R.A.; Wantuck, P.J. Los Alamos National Lab., NM (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9209164--1: New Mexico conference on the environment: toward a sustainable environment, Albuquerque, NM (United States), 13-15 Sep 1992). Order Number DE92018602. Source: OSTI; NTIS; INIS; GPO Dep.

Innovative waste treatment technologies are being developed to remove hazardous organic wastes from water and air. These technologies involve the generation of highly reactive free radicals and their reaction with organic compounds. Two efficient methods of producing these reactive free radicals are radiolysis and electrical-discharge plasmas. Radiolytic technology involves the irradiation of contaminated media with high-energy electron beams or x rays generated from the beams (megavolt energies, hundreds of kilorad doses). This process is best understood in aqueous solutions, in which sizable quantities of the free radicals e_{aq}^-, OH^*, and H^*, as well as the more stable oxidant H_20_2, are produced. These highly reactive species react with organic contaminants to produce $C0_2$, H_20, and salts, which are no longer hazardous. Nonequilibrium electrical-discharge plasmas involve the generation of copious quantities of reactive free radicals from the dissociation of molecular oxygen by energetic electrons in the gas-based discharge. One of the most promising technologies for plasma processing is based upon the "silent electrical discharge" that has proven to be industrially dependable for the generation of large quantities of ozone.

31663 (NEI-DK--910) **Emission of non-combusted hydrocarbons from stationary motors and turbines.** Energiministeriets Energiforskningsproject. Miljoe og restprodukter. Noerregaard, A. Dk-TEKNIK, Aalborg (Denmark). Energi og Miljoe. May 1992 49p. (In Danish). Contract EM-1323/86-9. Order Number DE92562872. Source: OSTI; NTIS.

EFP-86.

The consequences, in relation to effects on the emission of other damaging chemicals, of utilizing techniques for reducing nitrogen oxides emission from motors and turbines are described. The report is based on a detailed perusal of relevant literature. The reduction techniques investigated are those which reduce at the source and also those which aim to clean the effluent. The use of these techniques can result in an increase in the emission of carbon monoxide and unburned hydrocarbons. The combustion conditions which result in the production of CO are described. As a general rule it can be concluded that the combustion conditions that lead to low emissions of nitrogen oxides are often of a lower standard and so lead to an increase in the production of carbon monoxide and non-combusted hydrocarbons. The emphasis is on natural-gas-fired systems. (AB) (31 refs.).

31664 (NEI-DK--917) **Fitting catalytic converters on cars.** Bue Larsen, G. Dansk Teknologisk Inst., Taastrup (Denmark). Auto- og Motorteknik. Jun 1992 29p. (In Danish). Contract ENS-1243/90-0003. Order Number DE92562879. Source: OSTI; NTIS.

EFP-90.

The aim was to investigate potentials for fitting catalytic converters on older cars in order to reduce pollution from their exhaust gases. The investigation would then form the basis for deciding whether or not a campaign for fitting these converters should be started off in Denmark. The various types of converters currently on the market were studied, also with regard to which types of car they could be fitted. It was then possible to find out how large a proportion of Danish cars could be fitted with catalytic converters. Twelve cars were then selected for fitment, and measurements were taken on pollution extent, petrol consumption, and efficiency both before and after installation of the converters, and again after a longer period so the long-time effect could be estimated. The progress of the project is described and test results are presented in detail. It was found that the grade of conversion varied very significantly not only from car type to car type, but also in the cases of individual cars of the same type. Possible reasons for these divergencies are explained. It is stated that 44% of the total number of Danish cars could be fitted with catalytic converters. The price will depend on the demand. The very cheapest could cost two thousand four hundred Danish kroner. It could lead to a heavier petrol consumption in some cases. The importance of constant adjustment and control of individual cars that are fitted with catalytic converters is emphasized. (AB).

31665 (NRCN(ER)--029) **Estimation of population expected exposure as a result of mining in Sde Zohar field.** Talmor, A.; Leichter, J.; Weiser, G. Israel Atomic Energy Commission, Beersheba (Israel). Nuclear Research Center-Negev. Dec 1990. 18p. (In Hebrew). Order Number DE93601535. Source: OSTI; NTIS (US Sales Only); INIS.

Sde Zohar is a phosphate ore field west of Arad. these ores contains 150 ppm radioactive materials from uranium and thorium chains. This work predicts the potential radiation exposure hazards to the neighborhood population from mining and ore processing operations.

31666 (NUTEK-FBT--92-10) **Quantum chemical methods of V_2O_5-TIO_2 catalysts.** Bjoerkman, E. (Studsvik Energy, Nykoeping (SE)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden); Studsvik Energy, Nykoeping (Sweden). May 1992. 25p. (In Swedish, English). Project NUTEK-276-436. (STUDSVIK-EP--90-22). Order Number DE92563068. Source: OSTI; NTIS.

The project here reported is the initiation phase of a larger project which aims to study, with quantum chemical methods, the nitrogen oxide reduction with ammonia over V_2O_5/TiO_2 catalysts. The report includes a literature survey, which describes experimental and theoretical works. Different mechanisms and possible active sites are discussed in the report. It can be concluded, from the literature, that 1/the system has been studied extensively, 2/the crystal structure of V_2O_5 suggests three possible active sites, 3/ three possible mechanisms for the catalytic reduction of NO with NH_3 over V_2O_5 are suggested. 22 refs., 6 figs.

31667 (OY/PSTL-TIED--78) **Measurements, classification and valorization of environmental problems: Case rural area of Oulu.** Kiukaanniemi, E.; Paajala, J.; Maentymaa, E. Oulu Univ. (Finland). Research Inst. of Northern Finland. Dec 1991. 92p. (In Finnish). Order Number DE92562906. Source: OSTI; NTIS.

This research reviews the control technologies and measurements of the main components of the physical surroundings, the condition of soil, water and air. In the case of the air, e.g. the main cleaning technologies and air quality measuring techniques are reviewed. Additionally, the condition of factors effecting on the air quality in the rural area of Oulu have been studied. As the environmental effect analysis (YVA) process becomes more common in various kinds of applications, the reviews on the classification and valorization of the environmental effects will also be made. The formulation of the environmental index has been reviewed separately because it is one of the most straight-lined of the estimation method for environmental effects, and it is suitable, in some extend, for estimation of environmental development.

31668 (PNL-SA--20809) **Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin.** Whiteman, C.D.; Allwine, K.J. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Contract VN-08005-CAS. (CONF-9206256--1: 4. Arizona weather symposium, Scottsdale, AZ (United States), 10-12 Jun 1992). Order Number DE92019134. Source: OSTI; NTIS; GPO Dep.

In the winter of 1989–1990 a major meteorological and air pollution experiment was conducted in the Colorado Plateaus Basin (Richards et al., 1991). The focus of the experiment, conducted by Arizona's Soft River Project, was to investigate the influence of three 750-MW coal-fired power plant units at the Navajo Generating Station near Page, Arizona, on visibility at Grand Canyon National Park. As part of the meteorological experiment, surface and upper air data were collected from multiple sites within the basin. This data set is the most comprehensive meteorological data set ever collected within the region, and the purpose of this paper is to briefly summarize the key wintertime meteorological features of the Colorado Plateaus Basin and the Grand Canyon, through which the basin drains, using analyses of the Winter Visibility Study data. Our analyses focused primarily on thermally driven circulations within the basin and the Grand Canyon, but we also investigated the surface energy budget that drives these circulations and the interactions between the thermal circulations and the overlying synoptic-scale flows.

31669 (SCPRI-RM--01-1992) **Monthly results of measurements. January 1992.** Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France). 1991. 47p. (In French). Order Number DE93701136. Source: OSTI; NTIS (US Sales Only); INIS.

This report of the SCPRI exposes the principal results concerning the routine monitoring of environmental radioactivity in France: atmospheric dusts, rainwater, surface water, underground water, sewage water, drinking water, food chain (milk, vegetables, fishes), sea water around nuclear sites and other sites. The activities of various radioisotopes are presented in tables.

31670 (SCPRI-RM–02-1992) **Monthly results of measurements. February 1992.** Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France). 1992. 42p. (In French). Order Number DE93701223. Source: OSTI; NTIS (US Sales Only); INIS.

This report of the SCPRI exposes the principal results concerning the routine monitoring of environmental radioactivity in France: atmospheric dusts, rainwater, surface water, underground water, sewage water, drinking water, food chain (milk, vegetables, fishes), sea water around nuclear sites and other sites. The activities of various radioisotopes are presented in tables.

31671 (SNV–3944) **Measurements of total ozone.** Josefsson, W. (Swedish Meteorological and Hydrological Inst., Norrkoeping (SE)). Swedish Environmental Protection Agency, Solna (Sweden). 1991. 71p. Order Number DE92563059. Source: OSTI; NTIS.

The renewed concern about the ozone layer initiated a project of monitoring the total ozone in 1987. A Brewer ozone spectrophotometer at the Swedish Meteorological and Hydrological Institute (SMHI) in Norrkoeping and previously used for solar ultraviolet radiation measurements was repaired and recalibrated. It is now in regular operation since February 1988. This report summarizes the measurements and efforts during 1990. Changes in the observation schedules have been undertaken. The software was modified to improve measurements at low solar elevations, which are especially important during the winter season at high latitudes. Daily values of the valuable Dobson measurements from Uppsala during the period 1951 to 1966 have been processed and these are compared with more recent measurements in Norrkoeping. The effects of using different ways to compute average monthly values of an incomplete set of data are briefly discussed. The longterm variation of total ozone at these stations is presented. A new station has been established at Vindeln, in the northern part of Sweden, using the old Uppsala instrument, Dobson 30. Regular observations starts early 1991. 14 refs., 29 figs.

31672 (SNV–3945) **Air monitoring in the Arctic: 1980-90.** Heintzenberg, J. (Stockholm Univ. (SE). Dept. of Meteorology); Holmen, K.; Odh, S.Aa.; Ogren, J. Swedish Environmental Protection Agency, Solna (Sweden). 1991. 49p. Order Number DE92563060. Source: OSTI; NTIS.

Since 1979 aerosol and CO_2 measurements have been made in the Svalbard region. While exploring different sites for a permanent baseline station through CO_2 sampling during limited periods of time intensive experiments were conducted to elucidate the physical and chemical characteristics of the Arctic haze phenomenon. This report summarizes all gas- and particle measurements taken until the end of 1990. Parameterizations for characteristics of the Arctic aerosols are given. Long term trends and seasonal variations of CO_2 concentrations in the European Arctic are compared to results from other high latitude stations in the northern hemisphere. Several examples of continuous gas and particle measurements on Spitsbergen are discussed to demonstrate their value for the study of atmospheric and oceanic processes in the Svalbard region. 35 refs., 14 figs., 3 tabs.

31673 (UCRL-JC–107758-R1) **A finite element/finite difference approach for modeling three-dimensional flow and pollutant dispersion around structures.** Lee, R.L. Lawrence Livermore National Lab., CA (United States). Jun 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-921110–20: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92019377. Source: OSTI; NTIS; GPO Dep.

We are developing state-of-the-art numerical tools that can be used to provide reliable estimates of potential emissions at industrial sites. In particular we have focused our efforts in generating models that can simulate the wind flow and dispersion of airborne pollutants around surface-mounted structures such as buildings or building complexes. The calculational procedure that has been chosen consists of two sequential steps, namely: (i) Prediction of the mean flow via a turbulent flow model; and, (ii) Employment of the calculated flow field to drive a particle-in-cell transport and diffusion model. A benchmark simulation is performed in which numerical results from the flow model are compared with other numerical models and with experimental data for flow over a backward-facing step. We also present results from three-dimensional simulations of flow and dispersion over a two-building complex.

31674 (UCRL-JC–108957) **A computer simulation of ecosystem processes in forests for application to air pollution, acid precipitation and global change.** Kercher, J.R. (Lawrence Livermore National Lab., CA (United States)); Anderson, P.D. Lawrence Livermore National Lab., CA (United States). 17 Jul 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920771–5: 1992 summer computer simulation conference, Reno, NV (United States), 27-30 Jul 1992). Order Number DE92019616. Source: OSTI; NTIS; GPO Dep.

We have developed a simulation model, TREE, of the effects of gaseous air pollutants and acid precipitation on the forest ecosystem processes of tree productivity and growth. This model is based on an existing general model of forest ecosystem processes developed for regional application (FOREST-BGC) combined with an existing model of plant productivity and transpiration (BACROS). The former model uses daily and annual time-steps; BACROS uses hourly time-steps and computes gaseous pollutant (ozone) uptake. In FOREST-BGC, we model the effects of ozone by reducing productivity based on the cumulative uptake for each leaf age-class. The model computations convert this reduction in productivity to a reduction in growth. This version of the model restricts consideration of acid precipitation to possible effects on productivity due to foliar exposure. Basic model performance has been studied for ponderosa pine exposed to ozone at the USFS Chico Tree Improvement Center The model simulates observed phenomena such as draw down of soil water during summer months. For ozone levels for the Chico Field Site for the 1990 season, maximum daily ozone uptake occurred in August with peak of 2.2×10^{-5} kg m^{-2} d^{1}. Cumulative annual ozone uptake for current year needles was 3.2×10^{-2} kg m^{-2} producing a 12.6% reduction in productivity for current year needles and a 13.3% reduction in chlorophyll and effective leaf area. Total transpiration was 0.95 m. The model is now being used to develop a terrestrial ecosystem submodel for a global scale Earth System Model (ESM) that integrates interacting atmospheric, oceanic, and land system components. Algorithms from the forest model will support feedback calculation of the effect of forests on atmospheric physics and chemistry as well as calculate effects of climate- and CO_2-change on forest productivity.

31675 (UCRL-JC–109697) **Dense-gas dispersion advection-diffusion model.** Ermak, D.L. Lawrence Livermore National Lab., CA (United States). Jul 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9208112–2: 1992 JANNAF Safety and Environmental Subcommittee meeting, Monterey, CA (United States), 10-14 Aug 1992). Order Number DE92019617. Source: OSTI; NTIS; INIS; GPO Dep.

A dense-gas version of the ADPIC particle-in-cell, advection-diffusion model was developed to simulate the atmospheric dispersion of denser-than-air releases. In developing the model, it was assumed that the dense-gas effects could be described in terms of the vertically-averaged thermodynamic properties and the local height of the cloud. The dense-gas effects were treated as a perturbation to the ambient thermodynamic properties (density and temperature), ground level heat flux, turbulence level (diffusivity), and windfield (gravity flow) within the local region of the dense-gas cloud. These perturbations were calculated from conservation of energy and conservation of momentum principles along with the ideal gas law equation of state for a mixture of gases. ADPIC, which is generally run in conjunction with a mass-conserving wind flow model to provide the advection field, contains all the dense-gas modifications within it. This feature provides the versatility of coupling the new dense-gas ADPIC with alternative wind flow models. The new dense-gas ADPIC has been used to simulate the atmospheric dispersion of ground-level, colder-than-ambient, denser-than-air releases and has compared favorably with the results of field-scale experiments.

31676 (UCRL-JC–110364) **A correlated K-distribution model of the heating rates for CH_4 and N_2O in the atmosphere between 0 and 60 km.** Grant, K. (Lawrence Livermore National Lab., CA (United States)); Grossman, A.S.; Pollack, J.B.; Freedman, R. Lawrence Livermore National Lab., CA (United States). 1 Jun 1992. 20p. Sponsored by Environmental Protection Agency, Washington, DC (United States); National Aeronautics and Space Administration, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9206257–1: 15. annual review conference on atmospheric transmission models, Bedford, MA (United States), 2-3 Jun 1992). Order Number DE92019376. Source: OSTI; NTIS; GPO Dep.

An infrared radiative transfer model using the correlated-k technique is being developed for use in atmospheric chemistry and climate models at LLNL, as well as for stand-alone radiative diagnostics. This implementation of the correlated-k algorithm will provide a computationally efficient means to calculate atmospheric radiative fluxes and heating rates. It will also allow for both time-varying gas concentrations and for the rapid inclusion of new gases into the model. We present both a general background of the c-k method and the results of applying our prototype model to absorption by CH_4 and N_20 in the 7–9 micron wavelength band. The correlated-k algorithm maps the highly structured absorption coefficient versus wavelength relationship into a substantially smoother monotonic relationship between the absorption coefficient and its cumulative probability distribution. This provides a substantial reduction in computational complexity, relative to line-byline calculations, while maintaining a high degree of accuracy.

31677 (UCRL-JC–110377) **Comparison of two stochastic models of scalar diffusion in turbulent flow.** Rodean, H.C. (Lawrence Livermore National Lab., CA (United States)); Lange, R.; Nasstrom, J.S.; Gavrilov, V.P. Lawrence Livermore National Lab., CA (United States). Jul 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48 ;AC08-88NV10617. (CONF-9209158–3: 10. symposium on turbulence and diffusion, Portland, OR (United States), 29 Sep - 2 oct 1992). Order Number DE92019381. Source: OSTI; NTIS; GPO Dep.

This report describes and compares two Lagrangian stochastic models for turbulent diffusion: (1) the random velocity increment model based on the Langevin equation and (2) the random displacement model. We apply both models to identical test problems for one-dimensional (vertical) diffusion, using identical parameterizations of turbulence statistics as inputs. We compare the results and discuss the advantages and disadvantages of each model. This work is part of an effort to improve the ADPIC dispersion model (Lange, 1978) which is based on the eddy diffusivity model. It is also part of a cooperative research effort on the transport and dispersion of hazardous materials in the atmosphere by the Lawrence Livermore National Laboratory and the Institute of Experimental Meteorology (USSR).

31678 (UCRL-JC–110559) **Modeling the dispersion of tracer plumes in the Colorado front range boundary layer during night- and day-time conditions.** Lange, R. Lawrence Livermore National Lab., CA (United States). 17 Jul 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9209158–4: 10. symposium on turbulence and diffusion, Portland, OR (United States), 29 Sep - 2 oct 1992). Order Number DE92019384. Source: OSTI; NTIS; GPO Dep.

The 1991 ASCOT (Atmospheric Studies in Complex Terrain) field study in the vicinity of the Department of Energy's Rocky Flats Plant, Colorado, was conducted to study the local and regional circulations and their interactions with synoptic flows over the complex terrain of the Rocky Mountains Colorado Front range. The ASCOT study focused on nocturnal flows from canyons and off slopes along the Front Range and their effect on transport and diffusion in the area. The study was combined with the Rocky Flats Winter validation Study (WVS) which had similar objectives but included a number of transition- and day-time experiments. Tracer plumes were released as part of this combined field campaign over the period of February 3–19, 1991 from the Rocky Flats Plant. Twelve intensive experiments, centered around eleven-hour long surface releases of sulfur hexafluoride (SF_6) tracer material, were conducted by teams of personnel from a number of national laboratories, government agencies and private contractors. The concentration patterns resulting from the transport and turbulent diffusion of the SF_6 traces plumes within the atmospheric boundary layer during two night-time, one morning transition, and one day-time period were simulated for this paper. The model used for these simulations was the Lawrence Livermore National Laboratory (LLNL) three-dimensional, diagnostic MATHEW/ADPIC atmospheric dispersion model for complex terrain and flow conditions. The following will describe the model, the selected experiments, and the results of the comparison of predicted with observed tracer concentrations.

31679 (UCRL-JC–110859) **The role of refrigerants in climate change.** Wuebbles, D.J. Lawrence Livermore National Lab., CA (United States). Jun 1992. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9206130–2: International Institute of Refrigeration meeting on refrigeration, energy and environment, Trondheim (Norway), 22-24 Jun 1992). Order Number DE92019385. Source: OSTI; NTIS; INIS; GPO Dep.

The primary chemicals used as refrigerants, chlorofluorocarbons (CFCs), and the compounds being considered as their replacements (HCFCs and HFCs) have been intensely studied because of concerns about chlorine chemistry effects on stratospheric ozone. Increasing attention is being given to the potential effects of these compounds in concerns about global warming. CFCs, HCFCs, and HFCs absorb infrared radiation and thus are greenhouse gases that can influence radiative forcing on climate. The purpose of this paper is to describe the current understanding of the role of refrigerants in affecting climate. Increasing atmospheric concentrations of CFCs have accounted for about 24 % of the direct increase in radiative forcing from greenhouse gases over the last decade. However, observed decreases in stratospheric ozone, thought to be connected to increasing stratospheric chlorine from CFCs, suggests a cooling tendency over the last decade. This cooling tendency has strong latitudinal gradients, but is, when globally averaged, about comparable in magnitude and opposite in sign to the radiative forcing from CFCs over this period. Because of their shorter atmospheric lifetimes, the direct radiative influence on climate from the replacement compounds should generally be much smaller than the CFCs.

31680 (WSRC-MS–92-236) **Structure of the nocturnal boundary layer over a complex terrain.** Parker, M.J. (Westinghouse Savannah River Co., Aiken, SC (United States)); Raman, S. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract AC09-89SR18035. Grant INT-82-19710;Grant ATM-8801650. (CONF-9209158–1: 10. symposium on turbulence and diffusion, Portland, OR (United States), 29 Sep - 2 oct 1992). Order Number DE92018141. Source: OSTI; NTIS; GPO Dep.

The complex nature of the nocturnal boundary layer (NBL) has been shown extensively in the literature Project STABLE was conducted in 1988 to study NBL turbulence and diffusion over the complex terrain of the Savannah River Site (SRS) near Augusta, Georgia. The third night of the study was particularly interesting because of the unusual phenomena observed in the structure of the NBL. Further analyses of microscale and mesoscale data from this night are presented using data from SRS network of eight 61 m towers over 900 km^2, from six launches of an instrumented tethersonde, from permanent SRL meteorological instrumentation at seven levels of the 304 m (1,000 ft) WJBF-TV tower near SRS, and additional data collected at 36 m (CC) by North Carolina State University (NCSU) including a one dimensional sonic anemometer, fine wire thermocouple, and a three dimensional propeller anemometer. Also, data from the nearby Plant Vogtle nuclear power plant observation tower and the National Weather Service at Augusta's Bush Field (AGS) are presented. The passage of a mesoscale phenomenon, defined as a microfront (with an explanation of the nomenclature used), and a vertical composite schematic of the NBL which shows dual low level wind maxima, dual inversions, and a persistent, elevated turbulent layer over a complex terrain are described.

31681 (YMP-A–42/1986) **Research programme for air quality 1986-1990.** Ministry of the Environment, Helsinki (Finland). Environmental Protection Dept. 1986. 60p. (In Finnish). Order Number DE92562936. Source: OSTI; NTIS.

The research programme of air quality management serves primarily the purposes of research planning and resource allocation required by the state and municipal authorities in the coming years. Even other institutions, which finance and carry out air pollution research, will hopefully benefit from the programme. The major projects consist of several subprojects and they cover a specific and extensive field of study. The major projects are as follows: Air composition and transformation, Effects of traffic on air quality, Harmful effects on the quality of life and their assessment, Long-term effects of neighbourhood emissions on health, and Economic study of air quality management. The programme comprises the description of the major projects, subprojects included. The minor projects are mentioned in the list of projects.

31682 (YMP-A–44/1986) **Emissions of nitrogen oxides in Finland in the 1980s and 1990s.** Jaakko Poeyry Oy, Helsinki (Finland). 1986. 115p. (In Finnish). Order Number DE92562935. Source: OSTI; NTIS.

To determine total nitrogen oxide emissions in Finland, the sources of emissions were divided into four groups: traffic and mobile machinery, energy generation, industry and other anthropogenic sources. The groups in question cover all the sectors of society which give rise to nitrogen oxide emissions. The emissions from natural biological and chemical processes are not included in the study. All nitrogen oxide emissions are in this study expressed as nitrogen dioxide (NO_2). This type of presentation is justified because other countries and international organizations also express NO_x emissions as NO_2. NO_x emissions have been calculated for the years 1980 and 1983. In addition, projections of NO_x emissions have been worked out for 1993, 1995 and 2000.

31683 (YMP-A–64/1987) **Finnish research project on acidification (HAPRO).** Anttila, P.; Kauppi, P. (eds.). Ministry of the Environment, Helsinki (Finland). Environmental Protection Dept. 1987. 109p. (CONF-8704408–: Symposium of the Finnish research project on acidification (HAPRO), Helsinki (Finland), 21-24 Apr 1987). Order Number DE92562937. Source: OSTI; NTIS.

Joint venture of the Ministry of Agriculture and Foresty and Ministry of the Environment.

This report contains the abstracts of presentations given at an extensive research symposium held on April 21 - 24, 1987, where over one hundred Finnish scientists presented their research results. The topics covered several research disciplines from pollutant emissions, atmospheric processes and deposition, forest ecology, limnology, soil science and plant physiology to environmental engineering, resource economics and policy research. It is the policy of HAPRO that original results will be published in relevant scientific journals. The secretariat of HAPRO, however, will continue editing and preparing summary reports of this kind based upon the original results.

5402 Environmental Sciences, Terrestrial

Refer also to citation(s) 30525, 30533, 30579, 30673, 30687, 30697, 30711, 30717, 30734, 30745, 30746, 30747, 30748, 30751, 30753, 30755, 30756, 30968, 31061, 31131, 31281, 31287, 31307, 31630, 31645, 31658, 31662, 31669, 31670, 31683, 31751, 32000, 32008, 32011, 32012, 32013, 32525, 32526, 32528, 32576

31684 (AEA-EE–0147) **Coastal resuspension.** Garland, J.A. AEA Environment and Energy, Harwell (United Kingdom). Nov 1991. 10p. Order Number DE92643802. Source: OSTI; NTIS (US Sales Only); INIS.

There are several potential mechanisms for the suspension in air of radioactive or other pollutants from coastal sea water, beaches, mud banks and salt marshes. Available measurements rarely allow these mechanisms to be distinguished. The limited data show a broad spread of results. When normalised by the concentration of radionuclides in beach sediments most of the data indicate concentrations equivalent to 1 to 30 $\mu g\ m^{-3}$ of sediment suspended in air, both for sampling sites on open coasts and near estuaries. Limited evidence for sampling sites located on salt marshes indicates about 0.2 $\mu g\ m^{-3}$ of suspended sediment. These values represent the aggregate effect of the mechanisms that operate at a limited number of coastal locations. At other locations it is possible that additional mechanisms will contribute to the suspension of sediment. (Author).

31685 (AECL–7822, pp. 270-295) **Comments on the state of knowledge about climatic and geological processes and extraterrestrial events.** Roots, E.F. (Department of the Environment, Ottawa, ON (Canada)). Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment. May 1984. (CONF-8211198–: Workshop on transitional processes, Ottawa (Canada), 4-5 Nov 1982). In *Proceedings of a workshop on transitional processes.* 308p. Order Number DE84901541. Source: OSTI; NTIS (US Sales Only); INIS.

The Workshop on Transitional Processes has provided a good review of the range of possible climatic, geological and extraterrestrial factors that could influence the integrity of a depository for radioactive waste buried in crystalline rock of the southern Canadian Shield. The discussion uncovered many areas where more knowledge is needed. Information about likely timing and periodicity of future events is poor, partly because all current experience is in a period that appears to be anomalously active, geologically and climatically. Attempts to model or simulate future conditions will be severely hampered by the difficulties of combining deterministic and stochastic happenings that may have linked or synergistic consequences. The workshop demonstrated also that the geosciences have a contribution to make to this important problem. There is justification for proceeding with the formulation of a comprehensive conceptual model of transitional processes that might affect the integrity of a buried vault over the next one million years.

31686 (ANL/CP–76749) **A quantitative method to detect explosives and other selected semivolatiles in soil samples by Fourier transform infrared spectroscopy.** Clapper-Gowdy, M. (Argonne National Lab., IL (United States)); Demirgian, J.; Lang, K.; Robaittaille, G. Argonne National Lab., IL (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9208112–1: 1992 JANNAF Safety and Environmental Subcommittee meeting; 1992 Federation of Analytical Chemistry and Spectroscopy Socieitier (FACSS) conference, Monterey, CA (United States); Philadelphia, PA (United States), 10-14 Aug 1992; 20-25 sep Order Number DE92018771. Source: OSTI; NTIS; GPO Dep.

The current methods for hazardous waste site characterization are time consuming, cumbersome, and expensive. Typically, characterization requires a preliminary site assessment and subsequent sampling of potentially contaminated soils and waters. The samples are sent to laboratories for analysis using EPA-certified methods. It is often necessary to repeat the entire sampling-analysis cycle to characterize a site completely and accurately. For these reasons, new methods of site assessment and characterization are continually being researched. This paper describes a Fourier transform infrared (FTIR) spectroscopy method that rapidly screens soil samples from potentially hazardous waste sites. Analysis of a soil sample by FTIR takes approximately 10 minutes. The method has been developed to identify and quantify explosives in the field and is directly applicable to selected volatile organics, semivolatile organics, and pesticides. The soil samples are desorbed in a CDS 122 thermal desorption unit under vacuum into a variable pathlength, long-path cell heated to 180°C. The spectral data, 128 co-added scans at 1 cm^{-1} resolution, are collected and stored using a Nicolet 60SX FTIR spectrometer. Classical least squares (CLS) analysis has been used to obtain quantitative results.

31687 (BNL–47624) **The potential effects of concurrent increases in temperature, CO_2 and O_3 on net photosynthesis, as mediated by rubisCO.** Long, S. (Brookhaven National Lab., Upton, NY (United States)). Brookhaven National Lab., Upton, NY (United States). Jul 1992. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9206254–1: Air pollutants and plant metabolism conference, Blacksburg, VA (United States), 13-16 Jun 1992). Order Number DE92019411. Source: OSTI; NTIS; INIS; GPO Dep.

At the leaf level, under light saturating and light limiting conditions, it is shown that elevated atmospheric CO_2 concentration not only alters the scale of the response of carbon gain to rising temperature, but can alter the direction of response. These points bring into serious question the value of any predictions of plant production which ignore not only the direct effect Of $C0_2$ on carbon gain, but also the basic interactions of temperature, $C0_2$ and 0_3. Whilst many factors may potentially diminish the enhancement of lightsaturated leaf photosynthetic rates with increase in atmospheric CO_2 concentrations, no mechanism has so far been identified which could remove the parallel stimulation of light-limited photosynthesis.

31688 (CEAC-R-4-91) **Basic analysis of sugar cane lead and cane fields of an AIC.** Diaz Rizo, O. (Instituto Superior de Ciencia y Tecnologia Nuclear (ISCTN), La Habana (Cuba)); Saunders, M.; Herrerra, E.; Rodriguez, R.; Mendoza, A.; Meneses, N.; Griffith, J.; Mesa, S.; Zhuk, L.I.; Danilova, E.A. Comision de Energia Atomica, La Habana (Cuba). 1991 18p. (In Spanish). Order Number DE93601475. Source: OSTI; NTIS (US Sales Only); INIS.

The concentration of minor and trace elements in sugar cane leaves and soils samples from a cuban sugar factory were determine by means of thermal reactor neutron activation analysis (NAA) and X-ray Fluorescence Analysis (XRFA). The samples were taken according to the methodology of Sugar Minister for leaves and soils analysis. The concentration of 28 elements was determinate. the concentration values obtained by NAA, XRFA and previous analysis are compared.

31689 (CNIC-00389) **Distribution of natural uranium in Jiuquan ecological environment.** Yang Juncheng (Chinese Academy of Agricultural Sciences, Beijing, BJ (China). Inst. for Application of Atomic Energy); Gu Baming; Wan Yanxi. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 10p. (In Chinese). (IAAE-CN-0029.). Order Number DE93601408. Source: OSTI; NTIS (US Sales Only); INIS.

Concentration of natural uranium in soil, forage grass, ox, sheep and camel at Jiuquan area was determined, and the data were analyzed. Its natural distribution under equilibrium and the transfer from the soil to the forage grass then to the animal body were studied. Results show that the uranium concentration in soil was decreasing from 3.09mg/kg to 2.36 mg/kg (corresponding to the surface to 30 cm), then increasing to 2.82mg/kg (corresponding to 100 cm), so the lowest was at the depth of 30 cm. The descending order of concentration in eight kind of forage grasess is Chenopodium album L., Triticum Sativum Lam, Agropyron cristatum(L.) Gaertu, Hordeum vulgare var nudum (Ard.) Hook, Avenasativa L., Sphaerophysa salsula(Pall.) DC, Medicago sativa L. and Phragmites communis Trin, i.e. from the highest 1.48 x 10^{-3}mg/kg to the lowest 0.051 x 10^{-3}mg/kg. The U concentration in mutton was (0.48 ≈ 1.86) x 10^{-6}mg/kg and the average was 0.89 x 10^{-6}mg/kg, in sheep bone was (3.60 ≈ 16.20) x 10^{-6}mg/kg and the average was 9.9 x 10^{-6}mg/kg. Concentration of uranium in the mixed sample of beef and ox bone was 7.54 x 10^{-6}mg/kg, and in camel meat and bone was 3.35 x 10^{-6}mg/kg. The uptake of uranium from soil by forage grass varies with the amount of U in the soil, the type of soil and grass species. The transfer coefficients CT1 of uranium from soil surface layer, i. e. O to 30 cm, to forage grass were 2.98 x 10^{-4} for Chenopodium album L., 2.79 x 10^{-4} for Triticum sativum Lam and 2.67 x 10^{-5} for Phragmites communis Trin respectively. The coefficients CT2 of U from forage grass to ox, sheep and camel body were 7.29 x 10^{-3} ≈ 1.44 x 10^{-1} for sheep bone, 5.10 x 10^{-3} ≈ 1.25 x 10^{-1} for mixed sample of beef and ox bone, 2.26 x 10^{-3} ≈ 5.5 x 10^{-2} for mixed sample of camel meat and bone and 2.45 x 10^{-5} ≈ 2.41 x 10^{-4} for mutton respectively.

31690 (CNIC-00484) **A study on ^{90}Sr adsorption by the soils around Qinshan and Daya Bay nuclear power plants.** Zhao Wenhu (Chinese Academy of Agricultural Sciences, Beijing, BJ (China). Inst. for Application of Atomic Energy); Xu Shiming; Hou Lanxin. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 13p. (In Chinese). (CSNAS-0042.). Order Number DE93601409. Source: OSTI; NTIS (US Sales Only); INIS.

The patterns of ^{90}Sr adsorption and percolation were studied by using soil samples from 23 sites around Qinshan and Daya Bay nuclear power plants within a radius of 50km. The soils collected from different depths (0 ≈ 20 cm, 20 ≈ 30 cm, 30 ≈ 60 cm, 60 ≈ 100 cm) were held in the 15mm diameter plastic tubes after being sieved. The soil height in the tubes was 20cm. The experiments were conducted in three different treatments: (1) ^{90}Sr solution with the same specific activity (37000Bq/L) was filtered through the soils in the same volume (40mL); (2) ^{90}Sr solution with different specific activity (3700,37000,370000 Bq/L) was filtered through the soils in the same volume (40 mL); (3) ^{90}Sr solution with the same specific activity (37000 Bq/L) was filtered through the soils in different volumes (40,80,120 mL). The results showed that more than 97% ^{90}Sr could be adsorbed by the soil in 0 ≈ 2 cm depth. The ^{90}Sr measured in the soil of more than 5 cm depth and in the filtered solution were background. The adsorbed ^{90}Sr in the soil from Qinshan area was larger than that from Daya Bay. The difference is found to be due to different properties and pH values of the soils. It could be concluded that the contamination caused by solution of ^{90}Sr can be reduced by removing the surface soil.

31691 (CONF-9110402-1) **Effect of season, substrate composition, and plant growth on landfill leachate treatment in a constructed wetland.** Surface, J.M. (US Geological Survey, Ithaca, NY (United States)); Peverly, J.H.; Steenhuis, T.S.; Sanford, W.E. Oak Ridge National Lab., TN (United States). [1991]. 22p. Sponsored by USDOE, Washington, DC (United States); Geological Survey, Reston, VA (United States); New York State Energy Research and Development Authority, Albany, NY (United States). DOE Contract AC05-84OR21400. From Conference on constructed wetlands for water quality improvement; Pensacola, FL (United States); 21-24 Oct 1991. Order Number DE92018250. Source: OSTI; NTIS; GPO Dep.

In 1989 the US, Geological Survey (USGS), in cooperation with Tompkins County, New York Departments of Planning and Solid Waste, began a 3-year study at a municipal solid-waste landfill near Ithaca, N.Y., to test the efficiency of leachate treatment by constructed wetlands and to examine the associated treatment processes. Specific objectives of the study were to examine: (1) Treatment efficiency as function of substrate composition and grain size, degree of plant growth, and seasonal changes in evapotranspiration rates and microbial activity; (2) effects of leachate and plant growth on the hydraulic characteristics of the substrate; and (3) chemical, biological, and physical processes by which nutrients, metals, and organic compounds are removed from leachate as it flows through the substrate. This report addresses the first two of these objectives and briefly discusses the third. It (1) describes the substrate plots, leachate-distribution system, sampling methods, and analytical procedures; and (2) presents results in terms of (a) percent removal rates of selected constituents between inflow- and outflow-sampling points, (b) seasonal effects on constituent-removal rates, and (c) effect of substrate composition on constituent removal and plant growth.

31692 (CONF-9206224-1) **The use of biomarkers to assess environmental health.** Shugart, L.R.; Halbrook, R.S. Oak Ridge National Lab., TN (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From International conference on monitoring toxic chemicals and biomarkers; Berlin (Germany); 22-26 Jun 1992. Order Number DE92018491. Source: OSTI; NTIS; INIS; GPO Dep.

Environmental pollution has received considerable coverage in the news media. This has stimulated public interest and generated pressure on private industries and governmental agencies to take corrective action. Because the environmental issues have at times been presented in a simplistic and sensational manner, the corrective response by regulatory agencies and industry is often cursory and narrow. An approach, using biomarkers (biological responses), for assessing the biological and ecological significance of contaminants present in the environment is described. Living organisms integrate exposure to contaminants in their environment and respond in some measurable and predictable way. Responses are observed at several levels of biological organization from the biomolecular level, where pollutants can cause damage to critical cellular macromolecules and elicit defensive strategies such as detoxication and repair mechanisms, to the organismal level, where severe disturbances are manifested as impairment in growth, reproduction, developmental abnormalities, or decreased survival. Biomarkers can provide, not only evidence of exposure to a broad spectrum of anthropogenic chemicals, but also a temporally-integrated measure of bioavailable contaminant levels. A suite of biomarkers are evaluated over time to determine the magnitude of the problem and possible consequences. Pragmatically, the biomarker approach will help to assess the health of the environment, and, in addition, will enable scientists to defend the advice they provide concerning environmental issues.

31693 (DOE/EA–0615) **Security enhancement subproject: Protected area guard towers: Final environmental assessment.** Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (United States). Apr 1992. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00487. Order Number DE92019443. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The Pantex Plant in Amarillo, Texas proposes to design and construct four (4) reinforced concrete guard tower stations, access roads, and associated sitework in Zones 4 and 12 on the Pantex Plant property. Construction for this proposed project would begin in December 1992. The Pantex Plant is operated under contract to the US DOE. The Pantex Plant is located 17 miles northeast of Amarillo, Texas and employs approximately 2,400 people. Access to the plant requires a "Q" clearance. The assembly of nuclear weapons is the current principal operation performed at the Pantex Plant. The overall plant mission involves the development and fabrication of chemical high explosive components for nuclear weapons, assembly and disassembly of nuclear weapons, modification and repair of nuclear weapons, and surveillance testing and disposal of chemical high explosive. Special nuclear material (SNM) requires protection from theft or diversion by adversaries. Security personnel at the Pantex Plant currently detect unauthorized entry by monitoring with the PIDAS (Perimeter Intrusion Detection and Assessment System) while stationed in the existing guard towers. When the towers receive an alarm from the PIDAS, display boards indicate from which sector an intrusion is occurring. Guard towers are identified as secondary assessments for the PIDAS, providing a response position and, if necessary, a hardened fighting position. Should a situation, such as intrusion by terrorists, warrant a hardened fighting position, the guard towers are used as such. Existing security measures do not provide adequate protection for the Pantex Plant from unauthorized entry or inside adversaries. The environmental consequences of building and maintaining the guard towers is addressed at length.

31694 (DOE/EA–0733) **Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment.** URS Consultants, Inc., New York, NY (United States); USDOE Bonneville Power Administration, Portland, OR (United States). Jun 1992. 49p. Sponsored by USDOE, Washington, DC (United States). (DOE/BP–1863). Order Number DE92018403. Source: OSTI; NTIS; GPO Dep.

The Bonneville Power Administration (BPA) owns a 200-acre facility in Washington State known as the Ross Complex. Activities at the Ross Complex routinely involve handling toxic substances such as oil-filled electrical equipment containing polychlorinated biphenyls (PCBs), organic and inorganic compounds for preserving wood transmission poles, and paints, solvents, waste oils, and pesticides and herbicides. Hazardous waste management is a common activity on-site, and hazardous and toxic substances are often generated from these and off-site activities. The subject of this environmental assessment (EA) concerns the consolidation of hazardous and toxic substances handling at the Complex. This environmental assessment has been developed to identify the potential environmental impacts of the construction and operation of the proposal. It has been prepared to meet the requirements of the National Environmental Policy Act (NEPA) to determine if the proposed action is likely to have a significant impact on the environment. In addition to the design elements included within the project, mitigation measures have been identified within various sections that are now incorporated within the project. This facility would be designed to improve the current waste handling practices and to assist BPA in meeting Federal and state regulations.

31695 (DOE/ER/60627–4) **The flux and recycling of bioactive substances in the surface sediments of the deep basins off southern California: Final report.** Jahnke, R.A. Skidaway Inst. of Oceanography, Savannah, GA (United States). 18 Mar 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG09-88ER60627. Order Number DE92019172. Source: OSTI; NTIS; GPO Dep.

We have used pore water gradients and in situ benthic flux chamber measurements to assess the total and down-core variations in the organic carbon remineralization rate. To augment standard pore water extractions, we developed techniques to extract pore water samples at 2mm sampling intervals, greatly improving our assessment of near- surface vertical gradients. In addition, much emphasis was placed on directly measuring the exchange of chemicals between the bottom waters and sediment pore waters via in situ benthic flux chamber incubations. The latter were performed with the MANOP bottom lander, and in later expeditions, the Benthic Experimental chamber Instrument (BECI). Results from these measurements were used to assess the several aspects of seafloor organic matter diagenesis.

31696 (DPSP–88-1002-Vol.2) **Technical summary of groundwater quality protection program at the Savannah River Site (1952–1986): Volume 2, Groundwater monitoring results.** Heffner, J.D. (ed.). Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States). 1 Nov 1991. 300p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019936. Source: OSTI; NTIS; INIS; GPO Dep.

Data is presented regarding ground water monitoring results from the Savannah River Plant for the years of 1952-1986. (CBS)

31697 (EGG-BEG–9811) **Independent verification and benchmark testing of the UNSAT-H computer code, Version 2.0.** Baca, R.G.; Magnuson, S.O. EG and G Idaho, Inc., Idaho Falls, ID (United States). Feb 1990. 70p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019769. Source: OSTI; NTIS; GPO Dep.

Independent testing of the UNSAT-H computer code, Version 2.0, was conducted to establish confidence that the code is ready for general use in performance assessment applications. Verification and benchmark test problems were used to check the correctness of the FORTRAN coding, computational efficiency and accuracy of the numerical algorithm, and code, capability to simulate diverse hydrologic conditions. This testing was performed using a structured and quantitative evaluation protocol. The protocol consisted of: blind testing, independent applications, maintaining test equivalence and use of graduated test cases. Graphical comparisons and calculation of the relative root mean square (RRMS) values were used as indicators of accuracy and consistency levels. Four specific ranges of RRMS values were chosen for in judging the quality of the comparison. Four verification test problems were used to check the computational accuracy of UNSAT-H in solving the uncoupled fluid flow and heat transport equations. Five benchmark test problems, ranging in complexity, were used to check the code's simulation capability. Some of the benchmark test cases include comparisons with laboratory and field data. The primary findings of this independent testing is that the UNSAT-H is fully operationaL In general, the test results showed that computer code produced unsaturated flow simulations with excellent stability, reasonable accuracy, and acceptable speed. This report describes the technical basis, approach, and results of the independent testing. A number of future refinements to the UNSAT-H code are recommended that would improve: computational speed and accuracy, code usability and code portability. Aspects of the code that warrant further testing are outlined.

31698 (EGG-GEO–10330) **Independent verification and validation testing of the FLASH computer code, Versiion 3.0.** Martian, P. (Washington State Univ., Pullman, WA (United States). Dept. of Mechanical and Materials Engineering); Chung, J.N. EG and G Idaho, Inc., Idaho Falls, ID (United States); Washington State Univ., Pullman, WA (United States). Dept. of Mechanical and Materials Engineering. Jun 1992. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019768. Source: OSTI; NTIS; INIS; GPO Dep.

Independent testing of the FLASH computer code, Version 3.0, was conducted to determine if the code is ready for use in hydrological and environmental studies at various Department of Energy sites. This report describes the technical basis, approach, and results of this testing. Verification tests, and validation tests, were used to determine the operational status of the FLASH computer code. These tests were specifically designed to test: correctness of the FORTRAN coding, computational accuracy, and suitability to simulating actual hydrologic conditions. This testing was performed using a structured evaluation protocol which consisted of: blind testing, independent applications, and graduated difficulty of test cases. Both quantitative and qualitative testing was performed through evaluating relative root mean square values and graphical comparisons of the numerical, analytical, and experimental data. Four verification test were used to check the computational accuracy and correctness of the FORTRAN coding, and three validation tests were used to check the suitability to simulating actual conditions. These tests cases ranged in complexity from simple 1-D saturated flow to 2-D variably saturated problems. The verification tests showed excellent quantitative agreement between the FLASH results and analytical solutions. The validation tests showed good qualitative agreement with the experimental data. Based on the results of this testing, it was concluded that the FLASH code is a versatile and powerful two-dimensional analysis tool for fluid flow. In conclusion, all aspects of the code that were tested, except for the unit gradient bottom boundary condition, were found to be fully operational and ready for use in hydrological and environmental studies.

31699 (ES/ER/TM-33) **Approach and strategy for performing ecological risk assessments for the Department of Energy Oak Ridge Field Office Environmental Restoration Program: Environmental Restoration Program.** Suter, G.W. II; Redfearn, A.; White, R.K.; Shaw, R.A. Oak Ridge National Lab., TN (United States). Jul 1992. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019010. Source: OSTI; NTIS; INIS; GPO Dep.

This document is intended to supplement exiting US Environmental Protection Agency (EPA) guidance for ecological risk assessment at hazardous waste sites by providing guidance that is more specific and more tailored to US Department of Energy sites than the guidance available from the EPA. However, it is a conceptual strategy document and does not include specific guidance on data, assumptions, and models. That detailed guidance is under development and will be presented in subsequent documents. Ecological risk assessments are equal to human health risk assessments in regulatory importance and can use many of the same data and some of the same estimation methods. However, they also have peculiar data needs and methods. Ecological risk assessments begin with an initial scoping phase, termed hazard definition, that characterizes the sources, the potentially environment, and the assessment endpoints. In the subsequent measurement and estimation phase, in which data are obtained concerning source of the endpoint biota to the contaminants and the effects of those exposures, and assumptions and models are used to relate the data to the desired exposure and effects parameters. Finally, in an integration phase, termed risk characterization, the various exposure and effects estimates are combined to infer the existence, cause, magnitude, and extent of effects of contaminants on the ecological endpoints. This phase is much more complicated for ecological risk assessments than for human health assessments because more types of data are available. Ecological risk assessments estimate effects using laboratory toxicity test results, like human health assessments, but also use results of ambient toxicity tests and biological surveys.

31700 (INIS-mf-13331, pp. 10) **Measurement system of 'free' radon in rocks.** Assael, Y.; Yaffe, Y.; Even, O. Israel Geological Society, Jerusalem (Israel); Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center. 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/radiometric surveys; ALPHA DOSIMETRY; PHOTOGRAPHIC FILM DOSEMETERS; RADIOMETRIC SORTING; RADON

31701 (INIS-mf-13331, pp. 11) **Diagenesis of Inmar Formation, southern Israel: Stable isotope studies of carbonate minerals.** Ayalon, A. (Geological Survey of Israel, Jerusalem (Israel)); Longstaffe, F.J. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOLOGIC DEPOSITS/diagenesis; DOLOMITE; DIAGENESIS; ISOTOPE RATIO; ISRAEL; OXYGEN 18

31702 (INIS-mf-13331, pp. 42) **A reevaluation of the lake sediment chronology in the Dead Sea basin based on new ^{230}Th/U dates.** Gardosh, M. (Israel national oil company, Tel-Aviv (Israel)); Kaufman, A.; Yechieli, Y. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOLOGIC FORMATIONS/isotope dating; ISOTOPE RATIO; ISRAEL; THORIUM 230; URANIUM 230

31703 (INIS-mf-13331, pp. 52) **Ar-Ar age measurements on clay minerals from the Paleozoic section in southern Israel.** Harlavan, Y. (Geological Survey of Israel, Jerusalem (Israel)); Steinitz, G.; Starinski, A. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOLOGIC DEPOSITS/isotope dating; CLAYS; ISRAEL; MINERALS

31704 (INIS-mf-13331, pp. 53) **^{36}Cl in rainwater in Israel.** Herut, B. (Hebrew Univ., Jerusalem (Israel)); Katz, A.; Starinsky, A.; Paul, M.; Boaretto, E. Israel Geological Society, Jerusalem (Israel); Hebrew Univ., Jerusalem (Israel); Hebrew Univ., Jerusalem (Israel). Dept. of Physics. 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. ISRAEL/rain water; RAIN WATER/chlorine 36; ISOTOPE RATIO; ISRAEL

31705 (INIS-mf-13331, pp. 54) **The isotopic composition of strontium in Israeli rains.** Herut, B.; Starinsky, A.; Katz, A. Israel Geological Society, Jerusalem (Israel); Hebrew Univ., Jerusalem (Israel). 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RAIN WATER/chemical composition; STRONTIUM ISOTOPES/isotope ratio; QUANTITY RATIO; SIMULATION

31706 (INIS-mf-13331, pp. 113) **Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments.** Vangosh, A. (Australian National Univ., Canberra (Australia). Research School of Earth Sciences); Chivas, A.R.; McCulloch, M.T.; Kolodny, Y.; Starinsky, A. Israel Geological Society, Jerusalem (Israel); Australian National Univ., Canberra (Australia). Research School of Earth Sciences; Hebrew Univ., Jerusalem (Israel). 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. BORON ISOTOPES/isotope ratio; PALEONTOLOGY; PALEONTOLOGY; TRACER TECHNIQUES

31707 (INIS-mf-13331, pp. 106-107) **Sr and Nd isotopic constraints on the evolution of the Har Timna igneous complex, southern Israel.** Stern, R.J. (Texas Univ., Dallas, TX (United States)); Beyth, M. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381-: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOLOGIC FORMATIONS/isotope dating; ISRAEL

31708 (INIS-mf–13331, pp. 108) **Stable isotope geochemistry of dike/inmar sandstone contact zones, Makhtesh Ramon, Israel.** Summer, N.S. (Hebrew Univ., Jerusalem (Israel)); Ayalon, A.; Kolodny, Y. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381–: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. ISRAEL/geochemistry; ISOTOPE RATIO; ISRAEL; GEOCHEMISTRY; OXYGEN ISOTOPES

31709 (INIS-mf–13331, pp. 111) **K-Ar measurements in the Hatrurim formation, Arad area.** Tzur, D. (Hebrew Univ., Jerusalem (Israel)); Starinsky, A.; Kolodny, Y.; Steinitz, G. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381–: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. ISRAEL/geologic deposits; ISRAEL; MINERALS; QUANTITY RATIO

31710 (INIS-mf–13331, pp. 115) **Radon in rock units in the Negev, Israel.** Vulkan, U. (Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center); Zafrir, H.; Shiloni, Y.; Steinitz, G. Israel Geological Society, Jerusalem (Israel). 1991. 13p. (CONF-9104381–: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). In *Annual Meeting of the Israel Geological Society, 1991.* Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. ISRAEL/geologic surveys; RADON/radioecological concentration; ISRAEL; QUANTITY RATIO; RADON

31711 (INIS-mf–13333, pp. 43-44) **Involvement of fluids in regional metamorphism: A preliminary study of carbonate isotope compositional profiles on Sifnos (Cyclydes, Greece).** Ganor, J.; Matthews, A. Israel Geological Society, Jerusalem (Israel); Hebrew Univ., Jerusalem (Israel). 1989. 9p. (CONF-8904438–: 1989 Israel Geological Society annual meeting, Ramot (Israel), 2-5 Apr 1989). In *Annual Meeting of the Israel Geological Society, 1989.* Order Number DE92001407. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. SEA BED/geochemistry; GREECE; OXYGEN 18; GEOCHEMISTRY; TRANSPORT

31712 (INIS-mf–13333, pp. 82) **Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee.** Issar, A. (Ben-Gurion Univ. of the Negev, Beersheba (Israel)); Wolff, M.; Wakshal, E.; Geyh, M. Israel Geological Society, Jerusalem (Israel); Ben-Gurion Univ. of the Negev, Beersheba (Israel); Hebrew Univ., Jerusalem (Israel); Niedersaechsisches Landesamt fuer Bodenforschung, Hannover (Germany). 1989. 9p. (CONF-8904438–: 1989 Israel Geological Society annual meeting, Ramot (Israel), 2-5 Apr 1989). In *Annual Meeting of the Israel Geological Society, 1989.* Order Number DE92001407. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOLOGIC HISTORY/age estimation; CARBON ISOTOPES; ISOTOPE RATIO; ISRAEL; OXYGEN ISOTOPES

31713 (INIS-mf–13333, pp. 110-111) **K-Ar ages of the volcanism, southwestern Syria (the Muvlaat region).** Mor, D. (The Geological Survey of Israel, Jerusalem (Israel)); Steinitz, G.; Gvirtzman, G.; Schulman, N. Israel Geological Society, Jerusalem (Israel). 1989. 9p. (CONF-8904438–: 1989 Israel Geological Society annual meeting, Ramot (Israel), 2-5 Apr 1989). In *Annual Meeting of the Israel Geological Society, 1989.* Order Number DE92001407. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOLOGIC FORMATIONS/isotope dating; SYRIA

31714 (INIS-mf–13333, pp. 157) **Evidence for the origin of Ca in land snails living on basalts (Golan Heights) from their strontium isotopic composition.** Starinsky, A. (Hebrew Univ., Jerusalem (Israel)); Heinmann, A. Israel Geological Society, Jerusalem (Israel); Hebrew Univ., Jerusalem (Israel). 1989. 9p. (CONF-8904438–: 1989 Israel Geological Society annual meeting, Ramot (Israel), 2-5 Apr 1989). In *Annual Meeting of the Israel Geological Society, 1989.* Order Number DE92001407. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. AGE ESTIMATION/isotope ratio; SYRIA/age estimation; SNAILS; STRONTIUM ISOTOPES; SYRIA

31715 (INIS-mf–13333, pp. 161-162) **Boron isotope geochemistry in the terrestrial environment.** Vengosh, A. (Australian National Univ., Canberra (Australia). Research School of Earth Sciences); Chivas, A.R.; McCullosh, M.T.; Kolodny, Y.; Starinsky, A. Israel Geological Society, Jerusalem (Israel); Australian National Univ., Canberra (Australia). Research School of Earth Sciences; Hebrew Univ., Jerusalem (Israel). 1989. 9p. (CONF-8904438–: 1989 Israel Geological Society annual meeting, Ramot (Israel), 2-5 Apr 1989). In *Annual Meeting of the Israel Geological Society, 1989.* Order Number DE92001407. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. GEOCHEMISTRY/boron isotopes; GEOCHEMISTRY; ISOTOPE RATIO; SEA BED

31716 (INIS-mf–13344, pp. 7) **Radioecological aspects of former mining activities in the Saxon Erzgebirge.** Keller, G. (Universitaet des Saarlandes, Homburg/Saar (Germany). Inst. fuer Biophysik). Salzburg Univ. (Austria). Inst. fuer Allgemeine Biologie, Biochemie und Biophysik. 1991. 26p. (CONF-911011–: International workshop on radium, uranium, thorium and related nuclides in industry and medicine: history and current use, Badgastein (Austria), 1-3 Oct 1991). In *International workshop on radium, uranium, thorium and related nuclides in industry and medicine: history and current uses.* Order Number DE92642328. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. HOUSES/indoor air pollution; RADON 222/radioecological concentration; AIR; DOSE COMMITMENTS; ERZGEBIRGE DEPOSIT; EXHALATION; HOUSES; INHALATION; RADIOACTIVITY; SOILS; VENTILATION

31717 (INIS-mf–13347, pp. 12) **Recreating and measuring the underground environment of the late 1950's.** Scott, A.G. (DSMA Atcon Ltd., Toronto, ON (Canada)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URANIUM MINES/radiation monitoring; DUSTS; ELLIOT LAKE; FUNCTIONAL MODELS; HISTORICAL ASPECTS; RADIATION DOSES; RADON 220; RADON 222; VENTILATION

31718 (INIS-mf–13347, pp. 15-16) **Local static method for measuring radon emanation rate from porous materials.** Zhang, Z. (Ministry of Nuclear Industry, Henyang, HN (China). Uranium Mining Research Inst.). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/radioecological concentration; EMANOMETERS; GASEOUS DIFFUSION; QUANTITY RATIO; RADON; ROCKS

31719 (INIS-mf–13347, pp. 16-17) **A review of all sources of exposure to natural radiation in UK mines.** Dixon, D.W. (National Radiological Protection Board, Chilton (United Kingdom)); James, A.C.; Strong, J.C.; Wrixon, A.D. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINES/radioactivity; DAUGHTER PRODUCTS; DUSTS; GAMMA RADIATION; MINES; RADIOACTIVITY; RADON 220; RADON 222; UNITED KINGDOM

31720 (INIS-mf–13347, pp. 17-18) **Differences in 'in vitro' dissolution properties of settled and airborne uranium material.** Scripsick, R.C. (Los Alamos National Lab., NM (United States)); Tillery, M.I.; Soderholm, S.C.; Crist, K.C. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. DEPLETED URANIUM/dissolution; DISSOLUTION; DUSTS; IN VITRO; INHALATION; PARTICULATES

31721 (INIS-mf–13347, pp. 21) **Radon transport into underground openings.** Holub, R.F. (Bureau of Mines, Denver, CO (United States)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/radionuclide migration; AIR; GAS FLOW; GASEOUS DIFFUSION; MINES; PERMEABILITY; POROSITY; RADON; ROCKS

31722 (INIS-mf–13347, pp. 31) **Monitoring of radiation exposure from different natural sources in Polish coal mines.** Lebecka, J. (Central Mining Inst., Katowice (Poland)); Tomza, I.; Skubacz, K.; Chalupnik, S.; Skowronek, J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. COAL MINES/radiation monitoring; CALIBRATION; DAUGHTER PRODUCTS; EMANOMETERS; PERSONNEL DOSIMETRY; RADIATION DOSES; RADIUM; RADON 222

31723 (INIS-mf–13347, pp. 33) **Computer modeling of radon transport into underground openings.** Bates, R.C. (Bureau of Mines, Spokane, WA (United States). Spokane Research Center); Holub, R.F. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON/gas flow; MINES; PRESSURE DEPENDENCE; RADON

31724 (JINR-R–6-91-214) **Concentration of light homologs of superheavy elements in coal combustion.** Maslov, O.D.; Gavrilov, K.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 10p. (In Russian). Order Number DE92643815. Source: OSTI; NTIS (US Sales Only); INIS.

The results of the studying of the distribution of light homologs of the superheavy elements in the technological fractions in brown coal combustion and treatment of fly ash with the aim for obtaining the small mass samples for registration of spontaneously fissioning nuclei with the help of the low-background dielectric track detectors are described. The upper content limit for the superheavy elements in brown coal was set as 10^{-16} g/g. 17 refs.; 3 figs.; 4 tabs.

31725 (LUNBDS-NBBE–92-1036) **Soil acidification and element fluxes as related to tree species in deciduous forests of south Sweden.** Norden, U. Lund Univ. (Sweden). Dept. of Ecology. May 1992. 13p. Order Number DE92563054. Source: OSTI; NTIS.

The influence of tree species on element fluxes in throughfall and litterfall and on chemical properties of the soil was studied in south Sweden. Mature, even-aged individual trees of Fagus Sylvatica L., Quercus robur L., Carpinus betulus L., Tilia cordata Mill. and Acer platanoides L., growing side by side on initially similar soils in mixed deciduous forests were compared. The pH(KCl) of the topsoil (0 to 5 cm) beneath tree canopies at 70 sites decreased in the order lime>maple>hornbeam≈oak>beech. Topsoil pH increased with distance from the trunk (except for maple). Topsoil pH differences between species are not always able to predict pH differences further down in the profile. Sulphate was the dominating ion in throughfall and about half the amount was due to dry deposition. There were obvious differencs between deciduous tree species in their ability to acidify the soil profile of cambisols, in terms of a decrease of exchangeable base cation pools, an increase of exchangeable Al and H pools, and usually a decrease in pH. Hornbeam, and in particular lime, acidified the underlying soil (0 to 70 cm) least among species at 'poor' sites, which was explained by a lower cation excess accumulation in biomass, and by a lower capacity to capture acid dry deposition depending on the smaller canopies of these species. Oak acidified the deeper parts of the soil most among species at 'rich' sites, which was explained by a higher total cation excess accumulation in biomass and by a greater acid deposition to the taller and wider canopy of this species. The major part (50 to 70%) of the calculated current annual total proton load (TPL) on the soil originated from atmospheric deposition, the remainder was due to biological sources. Oak had the highest current TPL, hornbeam and in particular lime, the lowest.

31726 (ORNL/TM–11977) **Ecological effects of contaminants and remedial actions in Bear Creek.** Southworth, G.R. (Oak Ridge National Lab., TN (United States)); Loar, J.M.; Ryon, M.G.; Smith, J.G.; Stewart, A.J.; Burris, J.A. Oak Ridge National Lab., TN (United States). Jan 1992. 301p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019061. Source: OSTI; NTIS; INIS; GPO Dep.

Environmental Sciences Division Publication No. 3810.

Ecological studies of the Bear Creek watershed, which drains the area surrounding several Oak Ridge Y-12 Plant waste disposal facilities, were initiated in May 1984 and are continuing at present. These studies consisted of an initial, detailed characterization of the benthic invertebrate and fish communities in Bear Creek, and they were followed by a presently ongoing monitoring phase that involves reduced sampling intensities. The characterization phase utilized two approaches: (1) instream sampling of benthic invertebrate and fish communities in Bear Creek to identify spatial and temporal patterns in distribution and abundance and (2) laboratory bioassays on water samples from Bear Creek and selected tributaries to identify potential sources of toxicity to biota. The monitoring phase of the ecological program relates to the long-term goals of identifying and prioritizing contaminant sources and assessing the effectiveness of remedial actions. It continues activities of the characterization phase at less frequent intervals. The Bear Creek Valley is a watershed that drains the area surrounding several closed Oak Ridge Y-12 Plant waste disposal facilities. Past waste disposal practices in Bear Creek Valley resulted in contamination of Bear Creek and consequent ecological damage. Extensive remedial actions have been proposed at waste sites, and some of the have been implemented or are now underway. The proposed study plan consists of an initial, detailed characterization of the benthic invertebrate and fish communities in Bear Creek in the first year followed by a reduction in sampling intensity during the monitoring phase of the plan. The results of sampling conducted from May 1984 through early 1989 are presented in this report.

31727 (PNL-SA–20622) **Effects of lag and maximum growth in contaminant transport and biodegradation modeling.** Wood, B.D. (Pacific Northwest Lab., Richland, WA (United States)); Dawson, C.N. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206116–4: 9. international conference on computational methods in water resources, Denver, CO (United States), 9-12 Jun 1992). Order Number DE92019125. Source: OSTI; NTIS; INIS; GPO Dep.

The effects of time lag and maximum microbial growth on biodegradation in contaminant transport are discussed. A mathematical model is formulated that accounts for these effects, and a numerical case study is presented that demonstrates how lag influences biodegradation.

31728 (PNL-SA–20742) **Three-dimensional bioremediation modeling in heterogeneous porous media.** Wheeler, M.F. (Rice

Univ., Houston, TX (United States). Dept. of Mathematical Sciences); Roberson, K.R.; Chilakapati, A. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206116–3: 9. international conference on computational methods in water resources, Denver, CO (United States), 9-12 Jun 1992). Order Number DE92019085. Source: OSTI; NTIS; GPO Dep.

Recently Price University and Pacific Northwest Laboratory (PNL) have begun a collaborative research effort that involves laboratory, field, and simulation work directed toward validating remediation strategies, including both natural and in situ bioremediation at US Department of Energy (DOE) sites such as Hanford. Because of chemical, biological, geologic and physical complexities of modeling these DOE sites, one of the major simulation goals of the project is to formulate and implement accurate and efficient (parallel) algorithms for modeling multiphase/multicomponent mow and reactive transport. In this paper we first describe the physical problem that needs to be modeled. Because of the emergence of concurrent supercomputing, we propose accurate numerical algorithms that are based on operator-splitting in time and domain decomposition iterative techniques. In particular reference is made to the biodegradation of carbon tetrachloride.

31729 (PSI–120) **The radionuclide migration experiment - overview of investigations 1985 - 1990: Grimsel test site.** Frick, U. (Nationale Genossenschaft fuer die Lagerung Radioaktiver Abfaelle (NAGRA), Baden (Switzerland)); McKinley, I.G.; Baeyens, B.; Bradbury, M.H.; Eikenberg, J.; Heer, W.; Hoehn, E.; Smith, P.A.; Alexander, W.R.; Bossart, P.; Buehler, C.; Fierz, T. Paul Scherrer Inst. (PSI), Villigen (Switzerland). Mar 1992. 166p. (NAGRA-NTB–91-04.). Order Number DE93601467. Source: OSTI; NTIS; INIS.

This paper provides an overview of the investigations conducted from 1985 to 1990 as a part of the radionuclide migration experiment which is currently in progress in the Nagra underground research laboratory at the Grimsel pass in the Central Swiss Alps. The major aims of the project are (1) to test the extrapolation of laboratory sorption data to field conditions, (2) to analyse retardation processes in a fractured rock, (3) to improve and develop the necessary methodologies for site characterization and (4) to test existing geochemical, hydrodynamic, and solute transport models or their associated data bases. Field and modeling work are complemented by an extensive laboratory support programme. The Grimsel migration experiment demonstrates conclusively how the combined efforts of modeling, laboratory and field investigations can substantially widen the understanding of radionuclide transport in a geological environment. (author) figs., tabs., refs.

31730 (RISO-R–571) **Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989.** Aarkrog, A. (Risoe National Lab. (Denmark)); Chen, Q.J.; Dahlgaard, H.; Hansen, H.; Nielsen, S.P.; Buch, E.; Christensen, G.C. Risoe National Lab., Roskilde (Denmark). Jan 1992. 97p. Order Number DE92643816. Source: OSTI; NTIS; INIS.

Measurements of fallout radioactivity in the North Atlantic region including the Faroe Islands and Greenland are reported. Strontium-90, cesium-137 and cesium-134 were determined in samples of precipitation, sea water, vegetation, various foodstuffs (including milk in the Faroes), and drinking water. Estimates are given of the mean contents of ^{90}Sr and ^{137}Cs in human diet in the Faroes and Greenland in 1988 and 1989. ^{99}Tc data on marine samples, in particular sea water from the Greenland Sea, are reported. (au) (91 taps., 51 ills., 7 refs.).

31731 (RIVM–249200001) **Measurement of the radiation-level at the site of the Dutch National Institute for Public Health and Environmental Hygiene (RIVM) during the year 1990.** Dongen, R. van; Zanten, R. van. Rijksinstituut voor Volksgezondheid en Milieuhygiene, Bilthoven (Netherlands). Feb 1992. 16p. (In Dutch). Order Number DE93601407. Source: OSTI; NTIS; INIS.

This report contains results of dose rate measurements carried out during 1990 at the site of the Dutch National Institute for Public Health and Environmental Protection (RIVM). The dose rates were determined by means of thermoluminescence dosimeters on 12 locations. One of these locations was meant for determination of the natural background (reference) on the site. The dose rates averaged over a year appeared not to deviate significantly from the natural background levels in the Netherlands. The small increase of the annual mean of the dose rate near the building Sg, with regard to the reference level, is due to irradiation activities for calibration work and the replacement of the old ^{60}Co-source by a new one in July 1990 with a higher activity. (author). 8 refs.; 4 figs.; 2 tabs.

31732 (SKB-TR–91-48) **A compartment model for solute transport in the near field of a repository for radioactive waste (calculations for Pu-239).** Romero, L. (Royal Inst. of Tech., Stockholm (Sweden). Dept. of Chemical Engineering); Moreno, L.; Neretnieks, I. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Oct 1991. 45p. Order Number DE92643932. Source: OSTI; NTIS; INIS.

Radionuclides released from a damaged canister for spent fuel will leak through a damage in the canister wall and spread into the surrounding backfill. They will further migrate into water bearing fractures in the rock, through the backfill into the damaged zone around the drift and into the drift itself. Some substances may also diffuse through the rock to adjacent fracture zones. The nuclides will sorb on the materials along the transport paths. This very complex and variable transport geometry has been modelled using a compartment model which is based on simplifying a full three dimensional integrated finite difference model. The simplifications are supplemented by introducing analytical and semianalytical solutions at sensitive locations such as entrances and exits from holes and fractures and in the flowing water. (au).

31733 (SKB-TR–91-49) **Description of transport pathways in a KBS-3 type repository.** Pusch, R. (Clay Technology AB, Lund (Sweden)); Neretnieks, I.; Sellin, P. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 48p. Order Number DE92643933. Source: OSTI; NTIS; INIS.

A descriptive model of the radionuclide transport pathways in the near-field of a KBS-3 type repository has been developed. The model is based on the buffer and backfill properties, a generalized discontinuity model of the undisturbed rock and the effects of drilling and blasting. A reference description of the near-field rock properties is given, with implications for transport modelling. (au).

31734 (SKB-TR–91-51) **Gideaa study site. Scope of activities and main results.** Ahlbom, K. (Conterra AB, Uppsala (Sweden)); Andersson, J.E.; Nordqvist, R.; Ljunggren, C.; Tiren, S.; Voss, C. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Oct 1991. 110p. Order Number DE92643934. Source: OSTI; NTIS; INIS.

During the period from 1977-1986 SKB (Swedish Nuclear Fuel and Waste Management Co) performed surface and borehole investigations of 14 study sites for the purpose of assessing their suitability for a repository of spent nuclear fuel. The next phase in the SKB site selection programme will be to perform detailed characterization, including characterization from shafts and/or tunnels, of two or three sites. The detailed investigations will continue over several years to provide all the data needed for a licensing application to build a repository. Such an application is foreseen to be given to the authorities around the year 2003. It is presently not clear if anyone of the study sites will be selected as a site for detailed characterization. Other site with geological and/or socioeconomical characteristics judged more favourable may very well be the ones selected. However, as a part of the background documentation needed for the site selection studies to come, summary reports will be prepared for most study sites. These reports will include scope of activities, main results, uncertainties and need of complementary investigations. This report concerns the Gideaa study site. (au).

31735 (SKB-TR–91-52) **Fjaellveden study site. Scope of activities and main results.** Ahlbom, K. (Conterra AB, Uppsala (Sweden)); Andersson, J.E.; Nordqvist, R.; Ljunggren, C.; Tiren, S.; Voss, C. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Oct 1991. 114p. Order Number DE92643935. Source: OSTI; NTIS; INIS.

During the period from 1977-1986 SKB (Swedish Nuclear Fuel and Waste Management CO) performed surface and borehole investigations of 14 study sites for the purpose of assessing their suitability for a repository of spent nuclear fuel. The next phase in the SKB site selection programme will be to perform detailed characterization, including characterization from shafts and/or tunnels, of two or three sites. The detailed investigations will continue over several years to provide all the data needed for a licensing application to build repository. Such an application is foreseen to be given to the authorities around the year 2003. It is presently not clear if anyone of the study sites will be selected as a site for detailed characterization. Other sites with geological and/or socio-economical characteristics judged more favourable may very well be the ones selected. However, as a part of the background documentation needed for the site selection studies to come, summary reports will be prepared for most study sites. These reports will include scope of activities, main results, uncertainties and need for complementary investigations. This report concerns the Fjaellveden study site. (au).

31736 (SNV--3990) **Metal concentrations of the mor layer.** Andersson, Arne (Swedish Univ. of Agricultural Sciences, Uppsala (SE). Dept. of Soil Sciences); Nilsson, Aake; Haakansson, L. Swedish Environmental Protection Agency, Solna (Sweden). Dec 1991. 85p. Order Number DE92563061. Source: OSTI; NTIS.

With 3p Swedish abstract.

About 360 samples from the mor layer of podsolized Swedish forest soils were analysed for HNO_3 soluble Hg, Pb, Cd, Cr, Cu, Zn, Mn, Fe, Al, Ca, Mg, K and Na. The following median contents were found for the investigated heavy metals: Zn 55.2; Cu 6.29; Pb 41.3; Cr 2.52; Cd 0.64; Hg 0.233 and Mn 285 μg/g (dw). The corresponding median quantities in the mor layer were: Zn 318; Cu 35.7; Pb 246; Cr 14.1; Cd 3.77; Hg 1.38 and Mn 1565 kg/km^2. Based on the quartiles the contents and quantities per unit area of the analysed elements were depicted in maps of the sampled area. Concentrations of the investigated elements revealed local and regional deposition patterns better than the quantities including also the variation of the mor layer itself. Concentrations combined with quantities reveal the sensitivity of the soil to further exposition to the air pollutants. 92 refs., 32 figs., 4 tabs.

31737 (STRIPA-IR--91-32) **Site characterization and validation - monitoring of head in the Stripa mine during 1991.** Carlsten, S. (Geosigma AB, Uppsala (Sweden)); Nyberg, G.; Tammela, P.T.; Olsson, Olle. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 127p. Order Number DE92643936. Source: OSTI; NTIS; INIS.

The groundwater head has been monitored in a total of 60 borehole sections surrounding the site which is investigated as a part of the site characterization and validation project. This report contains basic data on the head monitoring system and graphical presentation of the results obtained during the period from January to June 1991. (au).

31738 (STRIPA-TR--91-26) **Final report on Test 4 - Sealing of natural fine-fracture zone.** Pusch, R. (Clay Technology AB, Lund (Sweden)); Boergesson, L.; Karnland, O.; Hoekmark, H. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Oct 1991. 134p. Order Number DE92643937. Source: OSTI; NTIS; INIS.

Test 4 involved characterization and grouting of a rather richly water-bearing natural fracture zone. Available rock structure data suggested that most inflowing water originated from a fracture set oriented NW/SE or from a N/S oriented zone perpendicular to the test drift, both intersecting it, but comprehensive drilling and a first grouting attempt showed that the actually most important zone was steep, NW/SE-striking and not intersecting the drift. Part of this zone was grouted in a second phase, and a number of tests indicated that the grouting had been relatively effective, yielding a drop in conductivity by approximately one order of magnitude. Analysis of drillings through the grouted rock showed that Alofix cement grout had entered fractures with an aperture of down to 10-20 μm to several decimeters depth. (au).

31739 (STRIPA-TR--91-27) **Evaporation measurement in the validation drift - part 2.** Watanabe, K. (Saitama University, Urawa, (Japan)); Osada, M. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Nov 1991. 121p. Order Number DE92643938. Source: OSTI; NTIS; INIS.

The second evaporation measurement was carried out from May 27 to June 13, 1991 in the validation drift. The evaporation rate distribution over the wall surface of the drift was successfully measured. The drift was excavated in March, 1990 so that the distribution at about 14 months after the excavation became clear by this second measurement. The first evaporation measurement was performed approximately one month after excavation. Temperature and humidity in the drift were almost the same over the entire wall surface during the measurement. Evaporation measurement were performed at 240 points on the matrix part of the wall surface and at about 550 points on some major fractures and traces of blast holes. The ceiling and side walls of the drift were covered with plastic sheets before the measurement. The measurement was carried out after the removal of plastic sheets. Transient evaporation changes after the removal of plastic sheets were measured at 30 points. The times for the evaporation rate to reach steady state after the removal of plastic sheets were in the range between about 5 hours to 60 hours. This transient time seems to be influenced not only by the geologic features of the wall but also by the air humidity above the wall. The average evaporation rates on matrix part, fractures and traces of blast hole were 0.09, 0.58 and 1.02 mg/m^2/s, respectively. Many high evaporation spots that might be the exits of seepage ways (channels) were found along some fractures. High evaporation spots were also found on some traces of blast holes. This implies that some fractures were newly created around the blast holes and ground water might flow through these fractures. (au).

31740 (STRIPA-TR--91-28) **Analysis of spatial correlation of hydraulic conductivity data from the Stripa mine.** Winberg, A. (Conterra AB, Goeteborg (Sweden)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Nov 1991. 78p. Order Number DE92643939. Source: OSTI; NTIS; INIS.

Hydraulic conductivity data from the Stripa mine were analysed to establish the characteristics of spatial variability. In addition the univariate statistics were calculated. Data on different supports were analysed; 10 m data, variable section length (1-7 m), and the latter variable section data deregularised to 1 m data. The analyses of data from boreholes with orthogonal orientations indicated an apparent anisotropy in the geometric mean hydraulic conductivity, with a one to two order higher mean conductivity in the east-west direction than that on north-south. The analysis of spatial variability on a 10 m support revealed weak spatial correlation, whereas that based on the data deregularised to 1 m data showed finite, well developed spatial correlation with practical ranges of c. 10 m. The covariance structure of hydraulic conductivity, as opposed to that of the calculated geometric mean hydraulic conductivities, showed an isotropic structure. The established variograms constitute a starting point for further data expansion and estimation by eg. stochastic continuum simulations of groundwater flow and mass transport within the SCV block at Stripa. (au).

31741 (STRIPA-TR--91-29) **Cross-verification testing of fracture flow and mass transport codes.** Schwartz, F.W. (Columbus, Ohio (USA)); Lee, G. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Nov 1991. 87p. Order Number DE92643940. Source: OSTI; NTIS; INIS.

This report discusses the results of a set of cross-verification tests involving codes from AERE Harwell Laboratory, Lawrence Berkeley Laboratory and Golder Associates Inc. The cross-verification exercises involved testing the ability to simulate the geometry of a complex network as well as flow and mass transport through three different types of deterministic fracture networks. The codes were able to generate virtually identical representations of a complex fracture network. For simple cases of flow, all three codes accurately predicted rates of flow. The accuracy of the calculations of hydraulic heads was generally acceptable but appeared to deteriorate in situations where there were extreme contrasts in fracture apertures. Flow test 3 involved Harwell and Golder codes simulating flow through a large 1000 fracture network for cases with two different drifts. The initial results were characterized by relatively large and consistent discrepancies in estimates of flow rates. This problem developed as a consequence of the mismatch in the scale of discretization of the fractures. Subsequent reruns of flow test 3b produced excellent agreement in the results. In terms of exercises to test the transport capabilities, all three modeling packages produced the correct solution for the simplest problem involving four fracture planes. The FracMan/MAFIC and NAPSAC codes were successfully cross-verified with transport tests 2 and 3. Thus, overall, the major objective of the modeling exercise to assure the validity of the primary calculational codes has been met. (au).

31742 (STRIPA-TR--91-31) **NAPSAC technical document.** Grindrod, P. (Intera - Environmental Division Henley on Thames, Oxon (United Kingdom)); Roberts, D.; Robinson, P.; Herbert, A. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 50p. Order Number DE92643941. Source: OSTI; NTIS; INIS.

NAPSAC is a numerical model of the flow of groundwater through fractured rock, and the associated transport of dissolved chemicals. The program can generate a very large three-dimensional network of random plane rectangular fractures, using probability distributions set by the user. It will find the steady-state (incompressible) flow and pressure fields in the network, using a finite element algorithm. A particle-tracking method is used to compute the transport of chemicals. This document, one of a series describing all aspects of NAPSAC relevant to the Stripa project, deals with the scientific background to the model. (au).

31743 (STRIPA-TR--91-35) **Modelling for the Stripa site characterization and validation drift inflow: prediction of flow through fractured rock.** Herbert, A. (AREA Decommissioning and Radwaste Harwell Laboratory, Oxon (United Kingdom)); Gale, J.; MacLeod, R.; Lanyon, G. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 315p. Order Number DE92643942. Source: OSTI; NTIS; INIS.

We present our approach to predicting flow through a fractured rock site; the site characterization and validation region in the Stripa mine. Our approach is based on discrete fracture network modelling using the NAPSAC computer code. We describe the conceptual models and assumptions that we have used to interpret the geometry and flow properties of the fracture networks, from measurements at the site. These are used to investigate large scale properties of the network and we show that for flows on scales larger than about 10 m, porous medium approximation should be used. The porous medium groundwater flow code CFEST is used to predict the large scale flows through the mine and the SCV region. This, in turn, is used to provide boundary conditions for more detailed models, which predict the details of flow, using a discrete fracture network model, on scales of less than 10 m. We conclude that a fracture network approach is feasible and that it provides a better understanding of details of flow than conventional porous medium approaches and a quantification of the uncertainty associated with predictive flow modelling characterised from field measurement in fractured rock. (au).

31744 (STRIPA-TR--91-36) **Evaporation measurement in the validation drift - part 3: Comparison between the first and second set of measurement results.** Watanabe, K. (Saitama University, Urawa (Japan)). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 54p. Order Number DE92643943. Source: OSTI; NTIS; INIS.

Two evaporation measurement series were carried out during April 3 - April 18, 1990 and May 27 . June 13, 1991 respectively in the validation drift. The first and the second measurement series were performed about one month and 14 months after the excavation, respectively. The results obtained by these measurement series are compared to each other with the aim to know the evaporation rate change during the period between these series. The evaporation rate from the matrix part of the rock mass decreased from the first measurement to the second. The average evaporation rate obtained from the second measurement series was about 1/4 of the first measurement. The frequency distribution of the evaporation rate measured in the second measurement series was more concentrated compared to the distribution of the first measurement series. The frequency distribution obtained by the second measurement seems to be approximated with a normal distribution curve. The evaporation rate from some major fractures did not decrease so much compared to the rate on the matrix part. The average rate obtained in the second measurement series on some fractures was about 80% of that of the first measurement series. The reduction of the evaporation rate may be due to the creation of an unsaturated zone around the drift. As the permeability decreases significantly when the saturation of the rock mass decreases, the evaporation rate or in the other word, the inflow rate must become smaller. An attempt was made to estimate the ratio between the matrix flow and the fracture flow. However, a detailed study is needed on unsaturated flow in rock mass for precise estimation. (au).

31745 (STRIPA-TR--91-37) **Characterization of the structure and geometry of the H fracture zone at the SCV site.** Gale, J. (Fracflow Consultants Incorporation, St Johns, Newfoundland (Canada)); MacLeod, R.; Bursey, G.; Straahle, A.; Tiren, S. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Dec 1991. 156p. Order Number DE92643944. Source: OSTI; NTIS; INIS.

A steeply dipping fracture zone (H zone), averaging 3.62 m in width, located in homogeneous, medium grained, granite adjacent to the Stripa mine was mapped in detail along eleven drift walls over vertical and horizontal distances of approximately 100 m. This mapping provided data on the variation in fracture geometry and consisted of scanlines that extended from the regularly fractured granite adjacent to the fracture zone, across the zone and to a similar distance on the other side of the fracture zone as well as one metre high areal maps across the entire width of the fracture zone. The fracture data have been analysed and the orientation, trace lengths and spacings of the individual clusters or groups within the fracture zone have been compared to both the geometry of the fracture system adjacent to the H zone, and the fracture geometry in the average rock. The fracture intensity within the H zone is clearly much greater than that in the average rock and there is considerable variability in the characteristics of the H zone. The general impression is one of decreasing fracture strength and trace length with increasing depth. Two strong sub-vertical fracture sets, a northeast-southwest and a weaker northwest-southeast set, are present in the H zone. Comparison of the mean orientations of the fracture sets in the H zone with the average rock in the validation drift, shows that the main differences are in the mean orientations of the clusters and the presence of the stronger sub-horizontal fracture sets. The H zone is characterized by mylonites and breccias as well as anastomosing structures, duplexes and splays. In addition, a significant number of fractures within the H zone show evidence of shear displacement and close examination of the orientation of these striations suggest an oblique dip-slip shear structure. (au).

31746 (UCRL--53779-89) **Hydrology and Radionuclide Migration Program: 1989 progress report.** Marsh, K.V. (comp.). Lawrence Livermore National Lab., CA (United States). Aug 1992. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92018782. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents results from the Lawrence Livermore National Laboratory's participation in the Hydrology and Radionuclide Migration Program (HRMP) at the Nevada Test Site (NTS) during fiscal year 1989. The report compares and summarizes studies of radionuclide and stable element transport atf radionuclide and stable the Cheshire and Cambric sites; progress toward the understanding of colloidal particle transport in porous and fractured media; further calibration of Marinelli beaker containers for gamma-ray spectroscopy; and an appendix listing all announced tests fired near the water table through October 1989. Four such tests were fired in FY89. Laboratory and model investigations of colloid transport in porous and fractured media have supported ongoing field investigations at the NTS. Aqueous chemistry has been shown to control colloid attachment and release from clean mineral surfaces. For colloidal deposits on fracture walls, the current experimental program will determine how this material responds to hydrodynamic forcing and if the porous colloidal deposit causes the more rapid transport of colloids than non-sorbing tracers. Fifteen radionuclides are either frequently found or likely to be found in HRMP and other environmental samples. For 3 of these 15 we have calibrated 4 gamma-ray detectors for use with samples contained in Marinelli beakers. Our calibrations for these three nuclides indicate that the technique is accurate and applicable to the types of environmental samples that we analyze.

31747 (USGS-OFR–92-137) **Earthquake-induced water-level fluctuations at Yucca Mountain, Nevada, April 1992.** O'Brien, G.M. Geological Survey, Denver, CO (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI08-92NV10874. Order Number DE92019280. Source: OSTI; NTIS; INIS; GPO; GPO Dep.

This report presents earthquake-induced water-level and fluid-pressure data for well USW H-5 during April 1992. Well USW H-5 is located in the Yucca Mountain area, Nevada. On April 22,1992 a 6.2-magnitude earthquake occurred in southern California which caused a maximum fluid-pressure change of approximately 50 centimeters in well USW H-5. Within 18 hours on April 25–26, 1992, three major earthquakes occurred in northern California. The water-level responses to these earthquakes were detected in well USW H-5. The maximum water-level fluctuation from the northern California earthquakes was in excess of 52.5 cm.

31748 (WSRC-MS–92-205) **Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector.** Winn, W.G. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-921102–6: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92015878. Source: OSTI; NTIS; INIS; GPO Dep.

The amount of 137Cs was measured in the PAR pond on the Savannah River Site. An underwater HPGe detector was used to inventory the gamma-emitting radionuclides in the sediment of the pond. The description and process of the equipment was given in this report. From the analysis of the compiled data, the drawdown can proceed in radiological guide lines.

5403 Environmental Sciences, Aquatic

Refer also to citation(s) 30525, 30659, 30698, 30711, 30752, 30817, 30818, 30819, 30968, 30984, 31383, 31667, 31669, 31670, 31683, 31687, 31691, 31699, 31730, 32008, 32015, 32515, 32546, 32547, 32576

31749 (CONF-9206254–2) **Forest declines: Some perspectives on linking processes and patterns.** McLaughlin, S.B. Oak Ridge National Lab., TN (United States). [1992]. 30p. Sponsored by USDOE, Washington, DC (United States); Forest Service, Washington, DC (United States). DOE Contract AC05-84OR21400. From Air pollutants and plant metabolism conference; Blacksburg, VA (United States); 13-16 Jun 1992. Order Number DE92019946. Source: OSTI; NTIS; INIS; GPO Dep.

The regional decline in vigor of some species of forest trees has become an important component in the ecological, aesthetic, and economic criteria by which the costs of anthropogenic pollution are weighed. Because declines are often complex and virtually never without significant natural environmental modifiers, determining the role of specific anthropogenic stresses in initiating or enhancing the rate and direction of change in forest condition represents a significant research challenge. Separation of primary mechanisms that point to principal causes from secondary responses that result from internal feedbacks and the milieu of modifying agents is a critical issue in diagnosing forest decline. Air pollutant stress may have its most significant effects on forest processes by accelerating or amplifying natural stresses. Studies of changes in forest metabolic processes have played an important role in evaluating the role of air pollution in four regional forest declines that are the focus of this paper. The decline of ponderosa pine in the San Bernardino Mountains of California, Norway spruce and silver fir in Europe, loblolly and shortleaf pine in the Southeastern United States, and red spruce in the Eastern Appalachian Mountains provide case studies in which physiological responses to air pollutants under field and laboratory conditions have provided important analytical tools for assessing likely causes. These tools are most effective when both mechanistic explanations and larger scale patterns of response are evaluated in an iterative feedback loop that examines plausible mechanisms and patterns of response at levels ranging from cell membranes to plant populations.

31750 (DOE/BP/07103–2) **Northwest Montana Libby/Hungry Horse Dams wildlife mitigation Columbian sharp-tailed grouse: Final report.** Cope, M.G. (Montana State Univ., Bozeman, MT (United States)). Montana State Univ., Bozeman, MT (United States); Montana Dept. of Fish, Wildlife and Parks, Kalispell, MT (United States). Jul 1992. 67p. Sponsored by USDOE, Washington, DC (United States). DOE Contract BI79-90BP07103. Order Number DE92040059. Source: OSTI; NTIS; GPO Dep.

Distribution, habitat use and survival of transplanted Columbian sharp-tailed grouse in the Tobacco Plains, Montana were studied from April, 1990 to August, 1991. For transplant purposes, 12 grouse (5 female and 7 male) were trapped on dancing grounds near Douglas Lake, British Columbia, Canada during spring, 1990. In April, 1991, trapping of 4 female and 2 male grouse for transplant occurred on the Sand Creek Wildlife Management Area in southeast Idaho while 3 additional males were transplanted from Douglas Lake. Minimum annual survival of transplanted grouse in the Tobacco Plains is relatively high (47%). High survival is possibly due to 2 factors: (1) topography and habitat characteristics that discourage dispersal and (2) the presence of limited but relatively good habitat. Two of 18 radio-equipped grouse dispersed out of the study area, while 2 others survived in the area for over 590 days. A negative correlation in distances moved between consecutive relocations and length of survival was seen in radio-equipped grouse in this study. Data collected during this study showed the importance of habitat associated with the Dancing Prairie Preserve. Three of 5 females transplanted in 1990 attempted to nest after being released. Nesting and brood rearing sites were characterized by dense grass cover with an average effective height ≥20 cm. Shrub cover was associated only with brood rearing sites. Overall habitat use by transplanted Columbian Sharp-tailed grouse showed an apparent avoidance of agricultural land and use of other habitat types in proportion to their availability.

31751 (DOE/ER/60846–3) **Colloids in groundwater: Their mobilization, subsurface transport, and sorption affinity for toxic chemicals: Annual technical progress report.** Gschwend, P.M. Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Civil and Environmental Engineering. 10 Jul 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-89ER60846. Order Number DE92018800. Source: OSTI; NTIS; INIS; GPO Dep.

Our originally stated objectives included: (1) development of a quantitative source function for colloid mobilization to groundwater, and (2) assessment of the most important colloidal phases to which nonpolar compounds sorb. We have been pursuing a series of studies to elucidate the roles of colloidal phases in subsurface environments. Most notably, we have discovered the critical role of secondary cementitious phases like goethite. We developed a new procedure for measuring "surface iron oxides" which is a great improvement over earlier methodologies. Currently, we are developing a unifying model with which we can predict the mobilization of colloids to groundwater flowing through such porous media. Also, we have been able to show that groundwater samples contain colloidal phases in sufficient quantities and of suitable properties to enhance the mobile load of toxic compounds like polycyclic aromatic hydrocarbons. Finally, we have synthesized our varied field investigations from sites in Massachusetts, New Jersey, Delaware, Nevada, Connecticut, and New York to yield a protocol for other researchers interested in evaluating colloids in groundwater. These accomplishments are discussed in more detail below. Through these efforts, we have become increasingly convinced of the central role played by colloidal phases in numerous subsurface phenomena controlling contaminant fates.

31752 (DOE/ID–22102) **Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990.** Bartholomay, R.C. (Geological Survey, Idaho Falls, ID (United States)); Edwards, D.D.; Campbell, L.J. Geological Survey, Idaho Falls, ID (United States). Mar 1992. 42p. Sponsored by USDOE, Washington, DC (United States); Department of the Interior, Washington, DC (United States). DOE Contract AC07-76ID01570. (USGS-OFR–92-91). Source: OSTI; US Geological

Survey, Books and Open-File Reports Section, Box 25425, Federal Center, Denver, CO 80225.

The US Geological Survey and the Idaho Department of Water Resources, in response to a request from the US Department of Energy, sampled 19 sites as part of a long-term project to monitor water quality of the Snake River Plain aquifer from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman area. Water samples were collected and analyzed for manmade pollutants and naturally occurring constituents. The samples were collected from seven irrigation wells, five domestic wells, two springs, one stock well, two dairy wells, one observation well, and one commercial well. Two quality assurance samples also were collected and analyzed. The water samples were analyzed for selected radionuclides, inorganic constituents, organic compounds, and bacteria. None of the radionuclides, inorganic constituents, or organic compounds exceeded the established maximum contaminant levels for drinking water. Most of the radionuclide and inorganic constituent concentrations exceeded their respective reporting levels. All samples analyzed for surfactants and dissolved organic carbon had concentrations that exceeded their reporting level. Toluene concentrations exceeded the reporting level in one water sample. Two samples contained fecal coliform bacteria counts that exceeded established maximum contaminant levels for drinking water.

31753 (DOE/PC/89782–T8) **Selenium speciation in ground water: Quarterly report.** Atalay, A. Oklahoma Univ., Norman, OK (United States). School of Civil Engineering and Environmental Science. 10 Jul 1990. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89782. Order Number DE92018429. Source: OSTI; NTIS; GPO Dep.

Selenium toxicity diseases in animals may occur when the intake exceeds 4 mg/kg and selenium deficiency symptoms may occur when dietary intake is less than 0.04 mg/kg. Since the selenium dietary requirement is very close to toxic concentration, it is important to understand the distribution of selenium in the environment. Selenium occurs in four oxidation states (-II, 0, +IV, and +VI) as selenide, elemental selenium, selenite and selenate. Selenate is reported as more soluble and less adsorbed than selenite. Selenate is more easily leached from soils and is the most available form for plants. Increased mobility of Se into the environment via anthropogenic activities, and the potential oxidation-reduction behavior of the element have made it imperative to study the aquatic chemistry of Se. For this purpose, Se species are divided into two different categories: dissolved Se (in material that passes through filters with 0.45 u openings) and particulate Se (in material of particle size > 0.45 mm) typically suspended sediment and other suspended solids. Element and colloidal phase, not truly dissolved, but passing through the filter is deemed to consist of selenium (-2,0). In dissolved state selenium may exist in three of its four oxidation states; Se(-II), Se(+IV), and Se(+VI). Particulate Se may exist in the same oxidation states as dissolved Se and can be found in different phases of the particulate matter. In sediments, Se may be within the organic material, iron and manganese oxides, carbonates or other mineral phases. The actual chemical forms of Se may be adsorbed to or coprecipitated with these phases (primarily selenite, SeO_3^{2-}) and selenate, SeO_4^{2-}. Selenide, Se(-II), can be covalently bound in the organic portion of a sediment. In addition, Se may be found in anoxic sediments as insoluble metal selenide precipitates, an insoluble elemental Se or as ferroselite ($FeSe_2$) and Se containing pyrite.

31754 (JAERI-M–91-214) **Performances of models for predicting mercury concentrations in fresh-water fish after chronic releases into rivers: Applications to a test scenario of the BIOMOVS study.** Togawa, Orihiko (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment). Japan Atomic Energy Research Inst., Tokyo (Japan). Jan 1992. 45p. Order Number DE93703957. Source: OSTI; NTIS; INIS.

The performances of assessment models for estimating the transfer and bioaccumulation of mercury in fresh-water ecosystems were tested by being applied to a test scenario proposed in an international cooperative study BIOMOVS. Two kinds of models have been developed to estimate mercury concentrations in fish after chronic releases into rivers. One uses a bioaccumulation factor approach which is applied to ecosystems in equilibrium, whereas the other is a dynamic model which considers the change of the concentrations in water and the metabolism in fish. The success of the models tested by three different scenarios depended upon whether mercury was in equilibrium in the environment. For the scenario where mercury concentrations reached equilibrium, the first model performed satisfactorily. For the scenario where equilibrium was not attained, the first model was not adequate but the second model could predict more accurately. The limitations of applications were suggested for the two models employed here. (author).

31755 (SKB-TR–91-50) **Concentrations of particulate matter and humic substances in deep groundwaters and estimated effects on the adsorption and transport of radionuclides.** Allard, B. (Linkoeping Univ. (Sweden). Dept. of Environmental Studies); Karlsson, Fred; Neretnieks, I. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Nov 1991. 32p. Order Number DE92643947. Source: OSTI; NTIS; INIS.

The concentration of particulate matter such as colloids and microbes in deep Swedish groundwaters has been measured and has been found to be low in all waters. The results are summarized in this paper. The sorption capacity of relevant radionuclides on the particulate matter has been assessed based on many direct measurements and on comparisons with measurements on similar systems. The maximum transport capacity of nuclides by the particulate matters has been estimated for reversible as well as irreversible sorption of nuclides to particles. (au).

31756 (SMHI-RO–14-92) **The conditions of the seas around Sweden: Report from the activities in 1991.** Andersson, Lars (and others); Carlberg, S.R.; Edler, L. SMHI Oceanographical Lab., Goeteborg (Sweden). Apr 1992. 56p. (In Swedish, English). Order Number DE92563048. Source: OSTI; NTIS.

This report describes SMHIs environmental monitoring in the open sea around Sweden, from the Skagerrak to the northern part of the Bothnian sea. Physical, chemical and biological parameters are studied in water samples, zoobenthos is studied in sediment grab samples and samples of fish and mussels are collected for the determination of harmful substances in the Kattegat, the Sound, the Baltic Proper and the Gulf of Bothnia. The temperature of the sea surface layer was higher than normal most part of the year, just as in 1989. The oxygen conditions in the south eastern Kattegat once again were unfavourable in late summer and early autumn. Also in the Baltic proper the bad oxygen situation in the deep water prevailed in several basins the whole year. In the Bornholm Basin hydrogen sulphide was present under the halocline the whole year with the exception of the August cruise. In the Gdansk Basin there is no longer any stratification and oxygen is mixed into the water from the atmosphere. This has improved the conditions in the bottom water. In the Eastern Gotland Basin hydrogen sulphide has been present in the bottom water for more than 13 years continuously. The Northern Central Basin, including the Landsort Deep, and the Western Central Basin were free from hydrogen sulphide the whole year. Nutrient conditions did not show any remarkable or unexpected changes during 1990. During the winter period phosphate and nitrate were present in about normal concentrations, which decreased to near detection limit during the production period in the spring and early summer and then increased again during autumn. The petroleum hydrocarbons showed during the spring roughly the same concentrations as during the previous years, whereas the autumn values were normal in the surface water only and all other values were high or very high. The reason for this has not been identified.

31757 (SNV–3949) **Radioecology in Nordic limnic systems - present knowledge and future prospects.** National Environmental Protection Agency, Solna (Sweden). 1991. 64p. Order Number DE92643948. Source: OSTI; NTIS; INIS.

This report was compiled during a meeting within the aquatic group in the Nordic Nuclear Safety Research Programme, in November 1990. It is a joint effort to summarize the results from post - Chernobyl research in Nordic limnic ecosystems. The most important pathways, processes and factors determining the ^{137}CS concentration in fish are identified and discussed. (au).

31758 (SNV–3963) **Wetlands and lakes as nitrogen traps: Research programme for the period 1 July 1990 - 30 June 1994.** Jansson, M. (Umeaa Univ. (SE). Dept. of Physical Geography); Andersson, R.; Herrmann, J.; Berggren, H. Swedish Environmental Protection Agency, Solna (Sweden). 1991. 28p. Order Number DE92563057. Source: OSTI; NTIS.

Also available in Swedish as SNV–3962.

The research on nitrogen in wetlands and lakes described in this programme has two aims. Primarily the efforts is laid on investigating and developing the feasibility of optimizing various kinds of nitrogen retention in different kinds of wetlands and lakes in order to lower the nitrogen transport to the sea from agricultural areas. Another important objective is to get deeper knowledge about the nitrogen cycles and processes in limnetic systems. Also some studies on nitrogen retention in forest wetlands, as well as nature conservancy aspects, are included.

31759 (TRITA-KUT–92-1066) **Numerical calculations on heterogeneity of groundwater flow.** Follin, S. Royal Inst. of Tech., Stockholm (Sweden). Dept. of Land and Water Resources. 1992. 259p. Order Number DE92643950. Source: OSTI; NTIS; INIS.

The upscaling of model parameters is a key issue in many research fields concerned with parameter heterogeneity. The upscaling process allows for fewer model blocks and relaxes the numerical problems caused by high contrasts in the hydraulic conductivity. The trade-offs are dependent on the object but the general drawback is an increasing uncertainty about the representativeness. The present study deals with numerical calculations of heterogeneity of groundwater flow and solute transport in hypothetical blocks of fractured hard rock in a '3m scale' and addresses both conceptual and practical problems in numerical simulation. Evidence that the hydraulic conductivity (K) of the rock mass between major fracture zones is highly heterogeneous in a 3m scale is provided by a large number of field investigations. The present uses the documented heterogeneity and investigates flow and transport in a two-dimensional stochastic continuum characterized by a variance in Y = ln(K) of $\sigma_Y{}^2 = 16$, corresponding to about 12 $\log_{10}$ cycles in K. The study considers anisotropy, channelling, non-Fickian and Fickian transport, and conditional simulation. The major conclusions are: * heterogeneity gives rise to anisotropy in the upscaling process, * the choice of support scale is crucial for the modelling of solute transport. As a consequence of the obtained results, a two-dimensional stochastic discontinuum model is presented, which provides a tool for linking stochastic continuum models to discrete fracture network models. (au) (14 figs., 136 refs.).

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5501 Behavioral Biology

Refer also to citation(s) 30579, 31849, 32004, 32005

5502 Biochemistry

Refer also to citation(s) 31766, 31768, 31996

31760 (DOE/ER/60503–352) **A physico-chemical study of some areas of fundamental significance to biophysics: Annual report, 1991–1992.** McGlynn, S.P.; Kumar, D. Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Chemistry. 30 Apr 1992. 99p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-87ER60503. Order Number DE92019916. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics: Radiation signatures; photoelectron spectroscopy of biologically active molecules; laser optogalvanic effect; magnetic circular dichroism; photochemistry of halogenated molecules; and density effects on high-n rydbergs.

31761 (DOE/ER/60503–353) **A physico-chemical study of some areas of fundamental significance to biophysics: Three-year comprehensive report, 1989–1992.** McGlynn, S.P.; Kumar, D. Louisiana State Univ., Baton Rouge, LA (United States). 30 Apr 1992. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-87ER60503. Order Number DE92019917. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics on Biophysics: Radiation signatures; electronic structure of steroids and vitamins; laser optogalvanic effect; vacuum ultraviolet spectroscopy; and ozone.

31762 (PNL-SA–20437) **Applying ion-molecule reactions to studies of gas-phase protein structure.** Ogorzalek Loo, R.R.; Loo, J.A.; Smith, R.D. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9205196–7: 40. ASMS conference on mass spectrometry and allied topics, Washington, DC (United States), 31 May - 2 jun 1992). Order Number DE92019131. Source: OSTI; NTIS; GPO Dep.

Whether solution phase differences in protein higher order structure persist in the gas phase, is examined by means of proton transfer reactions on ions generated by electrospray ionization of different solution conformations. Ion-molecule reactions were carried out in the atmosphere-vacuum interface of a quadrupole mass spectrometer with a Y-shaped capillary inlet-reactor. An amine (dimethyl-, trimethyl-, or diethyl-) were delivered to one inlet arm. Reactivities of bovine cytochrome c ions sprayed from denatured and native solutions were determined; the ions generated shifted to about the same charge states. Addition of equal amounts of amine to ions generated from different solution conformations of bovine ubiquitin also yielded similar final charge states; however, the average charge state increased with temperature. Myoglobin and apomyoglobin also yielded similar final charge states. The results suggest that for the non-disulfide linked proteins, either there are not significant differences in gas phase higher order structure, or proton transfer reactions are not sensitive enough to detect higher order structural differences arising from noncovalent interactions. 2 refs, 2 figs. (DLC)

31763 (PNL-SA–20440) **Capillary electrophoresis - electrospray ionization mass spectrometry in small diameter capillaries.** Wahl, J.H.; Goodlett, D.R.; Udseth, H.R.; Smith, R.D. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9205196–6: 40. ASMS conference on mass spectrometry and allied topics, Washington, DC (United States), 31 May - 2 jun 1992). Order Number DE92019123. Source: OSTI; NTIS; GPO Dep.

Extended abstract.

Methods (such as small inner diameter capillaries) are being explored to increase analyte sensitivity in capillary electrophoresis-electrospray ionization/mass spectroscopy(CE-ESI/MS). Results are reported for melittin in a protein mixture, with 10 to 100 μm ID capillaries; and for a mixture of aprotinin, cytochrome c, myoglobin, and carbonic anhydrase, with 5 to 50 μm ID capillaries. It is shown that an increase in solute sensitivity occurs when small ID capillaries (< 20 μm) are used in CE-ESI/MS for both a peptide and a protein mixture. 3 figs. (DLC)

31764 (PNL-SA–20444) **Internal energy effects on the solvation and reactivity of multiply charged biomolecules for electrospray ionization mass spectroscopy.** Light-Wahl, K.J.; Winger, B.E.; Rockwood, A.L.; Smith, R.D. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9205196–5-Extd.Abst.: 40. ASMS conference on mass spectrometry and allied topics, Washington, DC (United States), 31 May - 2 jun 1992). Order Number DE92019140. Source: OSTI; NTIS; GPO Dep.

Mild (capillary) interface conditions which do not completely desolvate the ions of proteins in electrospray ionization mass spectrometry (ESI-MS) may be required to probe the higher order structures and weak associations. For the small protein bovine ubiquitin, two ion distributions (unsolvated ions and unresolved solvated ions) were observed. The resolvable solvation for leucine-enkephalin with methanol and water shows that the use of countercurrent N_2 flow at the capillary affects the solvation observed. 2 figs. (DLC)

31765 (PNL-SA-20446) **Tandem mass spectrometry of multiply charged proteins with electrospray ionization.** Loo, J.A.; Smith, R.D. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9205196-4-Extd.Abst.: 40. ASMS conference on mass spectrometry and allied topics, Washington, DC (United States), 31 May - 2 jun 1992). Order Number DE92019139. Source: OSTI; NTIS; GPO Dep.

Short communication. PROTEINS/mass spectroscopy; PROTEINS; ALBUMINS; RNA-ASE; DISSOCIATION; IONIZATION; GLYCOPROTEINS; MASS SPECTRA

5504 Genetics

31766 (DOE/ER-0544P) **Human Genome, 1991–1992 program report.** USDOE Office of Energy Research, Washington, DC (United States). Office of Health and Environmental Research. Jun 1992. 248p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92040485. Source: OSTI; NTIS; GPO Dep.

This is the third report summarizing the Department of Energy Human Genome Program, its content, progress, and accomplishments. Since the program's conception in 1986 and initiation in 1987 by the DOE Office of Health and Environmental Research (OHER), its broad objectives have rapidly gained both national and international support. The program has made important strides in the development and application of technologies and tools that are required for the cost-effective characterization of the molecular nature of the human genome. Research highlights are noted from the Program as a whole and from the three principal DOE human genome centers at Lawrence Berkeley Laboratory, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory. These national laboratory facilities of DOE have been especially successful because they are organized to focus efforts, foster interdisciplinary projects, and use advanced technologies, some developed for other purposes, toward program goals. Essential work is also reported from 41 different research universities. Remarkable progress has been made in advanced instrumentation and informatics. A further indication of the increasing development of the DOE program is the simple statistic that the 1989–90 report had 157 pages and included 57 abstracts of work involving 211 scientists. The current program report contains over 240 pages and includes more than 150 abstracts of work involving over 400 investigators, essentially a doubling of DOE program size.

31767 (DOE/ER/61242-2) **Proceedings of the second international chromosome 22 workshop.** Children's Hospital of Philadelphia, PA (United States). [1991]. 8p. Sponsored by USDOE, Washington, DC (United States); Department of Health and Human Services, Washington, DC (United States). DOE Contract FG02-91ER61242. (CONF-9109391-Summ.: 2. international workshop on chromosome 22: progress and strategies, Montreal (Canada), 10-13 Sep 1991). Order Number DE92016096. Source: OSTI; NTIS; GPO Dep.

This report describes progress being made towards constructing a physical map of human chromosome 22, the subject of a workshop held in Montebello, Quebec from the 10–13 of September, 1991.

31768 (UCRL-52000-92-4-5) **Energy and Technology Review, April–May 1992.** Sefcik, J.A. (ed.). Lawrence Livermore National Lab., CA (United States). 1992. 67p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92018780. Source: OSTI; NTIS; GPO Dep.

This issue of "Energy and Technology Review" address Biomedical Science at Lawrence Livermore National Laboratory. The broad mission of biomedical research at the Laboratory is to identify and characterize effects on human health arising from energy use and development. Our goal is to understand the molecular and cellular mechanisms that lead to adverse health effects and to develop technologies and resources to prevent or ameliorate them. We provide the scientific foundation for understanding the longterm health consequences of energy alternatives and for developing technological solutions for these issues. The multidisciplinary team researchers the fields of biochemistry, molecular biology, cellular biology, and genetics with the computational, physical, and engineering resources available to us from the wider pool of people and facilities at LLNL. To fulfill our mission, we bring together research efforts in human risk assessment, human genome organization, structural biology, and technology development. In the area of human risk assessment, we are developing methods to assess genetic alterations and ill-health effects directly in humans. Two articles in this issue of Energy and Technology Review describe some of our work on human risk assessment. The first article explains one of the new methods we developed to measure mutations in humans, namely, the glycophorin-A (GPA) assay. The second deals with moles and melanoma incidence among employees of LLNL. Our research interests have historically emphasized an understanding of the structure of mammalian chromosomes and chromatin, which package the DNA. This focus has been manifest in our studies of DNA and proteins in sperm, in the organization and isolation of DNA repair genes, and in developing an organizational map of the human genome with a specific focus on chromosome 19. The third article in this issue provides a succinct overview of the goals, science, and results coming from the Human Genome Project.

5505 Metabolism

Refer also to citation(s) 31776

5506 Medicine

Refer also to citation(s) 31503, 31852, 31898, 31902, 31907, 31914, 31915, 31917, 31918, 31920, 31921, 32495

31769 (CEA-CONF-10842) **Targeting of macrophages for the scintigraphic evaluation of inflammatory lesions in a model of radio-induced inflammation in pigs.** Hoffschir, D. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection Sanitaire); Daburon, F.; Pittet, J.C.; Normier, G.; Binz, H.; Le Pape, A. CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection Sanitaire. 1991. 19p. (CONF-9103256-: 4. World Conference on Inflammation, Geneve (Switzerland), 15 Mar 1991). Order Number DE92566703. Source: OSTI; NTIS (US Sales Only); INIS.

For a new scintigraphic strategy based on the targeting of macrophages recruited by inflammatory lesions, a specific ligand able to interact with these cells both in vitro and in vivo has been developed. J001 is a 34 KDa acylated peptidopoly 1-3 galactoside isolated from proteoglycans of a nonpathogenic strain of klebsiella. When labelled with 99mTc then administrated by aerosol, this agent has been demonstrated to be a potent tool for the scintigraphic imaging of inflammatory lymph nodes in experimental berylliosis and in patients with sarcoidosis, lung tumors and ganglionic metastases. An experimental model was developed in pigs using an acute and localized muscular gamma irradiation in the limb with skin resection to prevent ulceration. Dynamic imaging was performed during two hours after intraveinous injection of 1 mg J001 labelled with 370 MBq 99mTc. The perfusion of the lesions was evaluated with scintigraphic data obtained both 15 min after IV injection of J001 or 99mTc 04-. The intensity of the fixation of J001 was quantified 2 hours after injection and expressed as a scintigraphic ratio: R2h = cpm in lesion/cpm in a healthy area in the same limb. After induction of irradiation, scintigraphic ratios exhibited a progressive increase to reach a maximum (R2h = 3.6) after 3 months. At six months, histological controls and clinical observations exhibited a significant decrease in inflammatory reaction, macrophages recruitment and fibrosis. J001 fixation was very sensitive to corticosteroids resulting in complete clearing of the scintigraphic images 12 to 24 hours after treatment. Two weeks were then required for a complete recovery of the inflammatory reaction and J001 fixation. So, targeting of macrophages with J001 should offer a sensitive and specific tool for the scintigraphic assessment of inflammation and possibly for the evaluation of anti-inflammatory drugs.

31770 (CEA-CONF-10847) **Use of a model for 3D image reconstruction.** Delageniere, S.; Grangeat, P. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees.

1991. 4p. (In French). (CONF-9109342–: Conference on the research and studies group on signal processing, Juan-les-pins (France), 16 Sep 1991). Order Number DE92566706. Source: OSTI; NTIS (US Sales Only); INIS.

We propose a software for 3D image reconstruction in transmission tomography. This software is based on the use of a model and of the RADON algorithm developed at LETI. The introduction of a markovian model helps us to enhance contrast and straitened the natural transitions existing in the objects studied, whereas standard transform methods smoothe them.

31771 (CEA-CONF–10855) **Interest of TOF PET for clinical applications.** Vacher, J.; Allemand, R.; Bouvier, A.; Monnet, O.; Tournier, E. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees. 1991. 15p. (CONF-9111256–: Conference on Advances in Quantitation and Imaging Methods, Liege (Belgium), 8-9 Nov 1991). Order Number DE92566707. Source: OSTI; NTIS (US Sales Only); INIS.

The interest of PET is now well established in medical research. Recently PET has proved to be also useful in the clinical domain e.g. for the diagnosis of epilepsy, myocardial disease etc... Its use has been so far limited by the cost of the radionuclide production and the cost of the PET itself. However inexpensive, compact cyclotrons and centralized distribution of F18 are beginning to facilitate the availability of radionuclides. Thanks to its performances in terms of high random rate, sensitivity gain, random reduction, TOF is becoming practical for clinical use, especially with new types of architecture allowing the reduction of the cost of the detection head, so far the main obstacle to the use of TOF PET in clinical domain.

31772 (CONF-910529–, pp. 419-433) **Radioarsenic labeled compounds: Synthesis and biological evaluation for potential application in nuclear imaging and therapy.** Emran, A.M. (Univ. of Texas, Houston (United States)); Shanbaky, N.M.; Stubbs, J.B.; Phillips, D.R. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Synthesis, in vitro and in vivo studies have been carried out to evaluate the potential of organoarsenic compounds for application in cancer chemotherapy and further utilization in nuclear medicine when labelled with the appropriate radioisotope for tumor imaging or therapy. Dimethylarsino derivatives of sulfhydryl-containing compounds have been synthesized and evaluated as carcinostatic agents. These compounds demonstrated moderate to weak activity. The successful use of simple radiolabeled inorganic and organic arsenicals for in vivo imaging of space occupying lesions in human brains, including various types of malignancies, has stimulated further development of such dimethylarsinomercapto derivatives. Previously, the authors had studied the kinetic behavior of two of these compounds, in vivo, using their radiolabeled analogues. These studies have illustrated the biodistribution patterns of these compounds and may be useful in determining their biological half-times. From this data, radiation dose estimates have been calculated for comparison of several radioisotopes of arsenic to evaluate their suitability for nuclear imaging or therapy.

31773 (CONF-910529–, pp. 467-481) **Dosimetry of ^{99m}Tc-P53, a new myocardial perfusion imaging agent.** Smith, T. (Clinical Research Centre, Middlesex (United Kingdom)); Lahiri, A.; Gemmell, H.G.; Davidson, J.; Smith, F.W.; Pickett, R.D.; Higley, B. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Internal dosimetry was carried out as part of Phase 1 clinical studies of ^{99m}Tc-P53, a new myocardial perfusion imaging agent developed by Amersham International plc. Six healthy male volunteers were studied, at each of two centers, by separate i.v. administration of ^{99m}Tc-P53 (138-173 MBq), at rest and following exercise. Biodistribution of ^{99m}Tc-P53 was examined by quantitative gamma-camera imaging, using anterior and posterior views on eight occasions from 5 minutes to 48 hours post-injection. Geometric mean count rates were calculated for whole-body and organs showing significant uptake, clearance was monitored, and all excreted activity was collected throughout the studies. Biokinetic data from the two centers were very similar. Blood activity fell rapidly to less than 0.2%/liter within 30 minutes; lungs and liver largely cleared within the first 4 hours; and initial heart uptake (about 1.2%) was well retained for 1 hour followed by a slow fall. About 80% of the radiopharmaceutical was excreted by 48 hours, almost equally via kidneys and gut. After exercise, whole body retention was consistently a few per cent higher than at rest even though some organs cleared more rapidly; this may be explained by increased muscle uptake after exercise. Residence times were calculated for 12 source organs and the remainder of the body, and organ radiation doses were estimated using MIRDOSE 2. The highest dose was 3 to 5 × 10^{-2} mGy/MBq (gallbladder) followed by doses in the range 1.5 to 3 × 10^{-2} mGy/MBq (GI tract and urinary bladder) based on a bladder voiding period of 3.5 hours. Effective doses were 8.90 × 10^{-3} and 7.1 × 10^{-3} mSv/MBq for the rest and exercise studies respectively. The effects, on estimated organ uptakes and dosimetry, of correcting for variations in attenuation were examined.

31774 (CONF-910529–, pp. 519-530) **A Monte Carlo simulation of boron neutron capture reactions in cells - Microdosimetric aspects.** Nguyen, T. (National Institutes of Health, Bethesda, MD (United States)); Brownell, G.L. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The neutron capture reaction in boron (^{10}B(n,α)^{7}Li) generates two short-range particles with high LET. The effect of neutron capture therapy (NCT) depends on the microscopic distribution of ^{10}B atoms in target cells. Due to the short ranges of the charged particles, an intracellular localization of ^{10}B in one region may produce a different effect to the cell than the same concentration of ^{10}B localized in other regions. Monte Carlo calculations of the energy deposition produced by ^{10}B disintegrations were performed to compare the effectiveness of ^{10}B localized in five separate source regions of the modeled cells: nucleus, nuclear membrane, cytoplasm, plasma membrane, and extracellular space. Two regions (nucleus and the whole cell) were independently considered the sensitive targets for the radiation therapy. An effectiveness factor (EF), defined by combining the radiation dose resulting from the ^{10}B disintegrations with the distribution of ^{10}B in a cell population, was used to determine the effectiveness of ^{10}B(n,α)^{7}Li reactions in different source regions. When an RBE and LET relationship was obtained from experimental data, the RBE values of the α and ^{7}Li radiations originating in different source regions were calculated, taking into account the stochastic nature of the origins of the ^{10}B disintegrations in these regions. The computations indicate that if the nucleus was the only radiation sensitive region, the nuclear ^{10}B disintegrations would be most effective for NCT, followed by ^{10}B disintegrations in the nuclear membrane (48% as effective). ^{10}B disintegrations in the cytoplasm, cell membrane, and extracellular space were about 10%, 5%, and 2%, respectively, as effective as nuclear ^{10}B.

31775 (DOE/ER/60600–1) **[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1988.** Zamenhof, R.G. New England Medical Center, Boston, MA (United States). [1988]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER60600. Order Number DE92040178. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes progress made in refining of neutron-induced alpha tract autoradiography, in designing epithermal neutron bean at MITR-II and in planning treatment dosimetry using Monte Carlo techniques.

31776 (DOE/ER/60725–1) **In vivo metabolism of I-123 labeled semisynthetic low density lipoproteins: Final technical**

report, September 28, 1988–September 27, 1990. Harper, P.V. Chicago Univ., IL (United States). Dec 1990. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER60725. Order Number DE92040343. Source: OSTI; NTIS; INIS; GPO Dep.

We previously observed that small model beta-strand peptides (MBPs) selectively bind to human low density lipoprotein (hLDL) in vitro, and that some MBPs can be labeled with I-123-tyramine cellobiose (I-123-TyC). We hypothesized that metabolism of semisynthetic hLDL should mimic that of covalently labeled native hLDL, and planned to evaluate the biodistribution in rabbits of semisynthetic hLDL; to determine effects of prior oxidation and acetylation of the adsorbing hLDL on binding of MBPs and upon biodistribution of semisynthetic particles; and to begin biodistribution studies with semisynthetic hLDL in human subjects, with the eventual goal of application to experimental and clinical nuclear imaging studies. We have synthesized a radioiodotyrosine-containing MBP, designated betay, as a more suitable adsorbant to hLDL thanradioiodine-TyC-MBP, and optimized conditions for preparing radioiodine-betaY:hLDL. In rabbits both betaY and betaY:hLDL complexes were cleared from the bloodstream much more rapidly than radioiodine-TyC-hLDL or In-111-hLDL, and betaY in either form showed a biodistribution pattern different from that of directly radiolabeled hLDL. Even though radioiodine-betaY can be quickly and easily produced, we conclude that neither betaY alone nor semisynthetic betaY:hLDL particles are likely to prove useful as tracers of hLDL metabolism in vivo.

31777 (DOE/ER/60894–3) **SPECT assay of radiolabeled monoclonal antibodies: Third yearly progress report, September 1991–February 1992.** Jaszczak, R.J. Duke Univ. Medical Center, Durham, NC (United States). Dept. of Radiology. Feb 1992. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-89ER60894. Order Number DE92019913. Source: OSTI; NTIS; INIS; GPO Dep.

The accurate determination of the biodistribution of radiolabeled monoclonal antibodies (MoAbs) is important for calculation of dosimetry and evaluation of pharmacokinetic variables such as antibody dose and route of administration. The hypothesis of this application is that the biodistribution of radiolabeled monoclonal antibodies (MoAbs) can be quantitatively determined using single photon emission computed tomography (SPECT). The major thrusts during the third year include the continued development and evaluation of improved 3D SPECT acquisition and reconstruction approaches to improve quantitative imaging of radiolabeled monoclonal antibodies (MoAbs), and the implementation and evaluation of algorithms to register serial SPECT image data sets, or to register 3D SPECT images with 3D image data sets acquired from positron emission tomography (PEI) and magnetic resonance images (MRI). The research has involved the investigation of statistical models and iterative reconstruction algorithms that accurately account for the physical characteristics of the SPECT acquisition system. It is our belief that SPECT quantification can be improved by accurately modeling the physical processes such as attenuation, scatter, geometric collimator response, and other factors that affect the measured projection data.

31778 (DOE/ER/60894–4) **SPECT assay of radiolabeled monoclonal antibodies: Comprehensive progress report, September 1989–February 1992.** Jaszczak, R.J. Duke Univ. Medical Center, Durham, NC (United States). Dept. of Radiology. Feb 1992. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-89ER60894. Order Number DE92019915. Source: OSTI; NTIS; INIS; GPO Dep.

The long-term goal of this research project is to develop methods to improve the utility of single photon emission computed tomography (SPECI) to quantify the biodistribution of monoclonal antibodies (MoAbs) labeled with clinically relevant radionuclides (^{123}I, ^{131}I, and ^{111}In) and with another radionuclide, ^{211}At, recently used in therapy. We describe here our progress in developing quantitative SPECT methodology for ^{111}In and ^{123}I. We have focused our recent research thrusts on the following aspects of SPECT: (1) The development of improved SPECT hardware, such as improved acquisition geometries. (2) The development of better reconstruction methods that provide accurate compensation for the physical factors that affect SPECT quantification. (3) The application of carefully designed simulations and experiments to validate our hardware and software approaches.

31779 (DOE/ER/61150–1, pp. 1) **The preparation and biodistribution of secondary Tc-HMPAO.** Billinghurst, M.W. (Health Sciences Centre, Winnipeg, Manitoba (Canada)); Abrams, D.N.; Shyka, C.; Vaziri, F.; Coutts, A.; Perez, J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

There is much interest in quantitative analysis of regional cerebral blood flow work with ^{99m}Tc-HMPAO. However in order to do this, it is necessary to know the biological fate of each of the radioactive species injected and the relative concentration of each at the time of injection. This work was undertaken to evaluate the biological fate of the secondary complex of ^{99m}Tc-HMPAO. Although the secondary form is routinely produced, the quantity is normally in the order of 10% or less, making it difficult to isolate a reasonable quantity without significant contamination with free pertechnetate and colloidal technetium. The authors found that by conducting an electrolytic labeling at elevated temperature (50C) and maintaining that temperature for a period of 1 hour post preparation, they were able to obtain approximately 40% secondary complex without significant levels of other impurities. Solvent extraction of the primary complex with ethyl acetate gave an aqueous product which contained more than 85% secondary complex, as determined by the standard three strip chromatographic analysis. In summary, uptake of the secondary complex of ^{99m}Tc-HMPAO is much slower than that of the primary complex and it does not bind irreversibly in the brain, but it is subject to some short term retention. Uptake is much slower than that of the primary. These results suggest that if the secondary complex is present in ^{99m}Tc-HMPAO, then it will not be possible to accurately quantitate the regional blood flow without taking into account the biodistribution of the secondary complex and the time course of that distribution.

31780 (DOE/ER/61150–1, pp. 4) **Synthesis and evaluation of technetium-99m monocationic mixed ligand complexes of phenyl substituted/condensed tetradentate Schiff's bases and trimethylphosphine.** Goomer, N.C. (Univ. of Texas, Dallas (United States)); Kulkarni, P.V.; Constantinescu, A.; Antich, P.; Parkey, R.W.; Corbett, J.R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The authors investigated new Tc-99m complexes making structural variations in the first ligand (Schiff's base) and keeping the same second ligand (trimethyl phosphine). Synthesis and evaluation of two new monocationic Tc-99m radiotracers, $[\text{Tc-99m } L_2 (PMe_3)_2]^+$ where L_2 represents N,N′-ethylene-bis(benzoylacetone imine) Schiff's base, and $[\text{Tc-99m } L_3 (PMe_3)_2]^+$ where L_3 represents N,N′-ethylene-bis(salicylaldehyde imine) Schiff's base, was carried out to study influence of phenyl group substitution/condensation on biodistribution of these Tc-99m complexes. Phenyl group will stabilize enolic forms of L_2 and L_3 (conjugation) and lead to strong Tc-99m complex formation. L_2 and L_3 were prepared by condensation of benzoylacetone (2eq) or salicylaldehyde (2eq) with ethylenediamine (1eq) in refluxing ethanol respectively. Radiolabeling of L_2 and L_3 with Tc-99m was carried out following Deutsch's method except that saturated ligand solutions in 50% ethanol-saline were used. The Tc-99m complexes formulated were administered I.V. into rats and animals sacrificed 15 minutes post injection for biodistribution studies. The biodistribution of reference complex, $[\text{Tc-99m } L_1 (PMe_3)_2]^+$ formulated either in saline or 30% HPB solution gave same results indicating that HPB does not alter biodistribution of the Tc-99m complex. The biodistribution studies of title complexes $[\text{Tc-99m } L_2 (PMe_3)_2]^+$ and $[\text{Tc-99m } L_3 (PMe_3)_2]^+$ in rats using formulation procedures gave similar results and Heart/Blood activity ratios were 1.7 and 2, respectively.

31781 (DOE/ER/61150–1, pp. 5) **Tc-99m-labeled adriamycin.** Ozker, K. (Univ. of Istanbul (Turkey)); Collier, B.D.; Isitman, A.T.; Abdel-Dayem, H.M.; Hellman, R.S.; Krasnow, A.Z.; Trembath, L.; Urgancioglu, I. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Adriamycin (ADM) is a wide spectrum antineoplastic antibiotic whose action is based on binding and interaction with DNA. The purpose of this study is to develop a single photon emitting tracer to study ADM pharmacokinetics, on the assumption that this agent would be transported to ADM sensitive malignancies, with an alternative potential in studying ADM-induced cardiac toxicity. An electrolytic technique was used for labeling Tc-99m-ADM due to its mild nature under physiological conditions. Biodistribution in rats and repeated TLC studies demonstrated that Tc-99m-ADM was stable. In rats, radioactivity was rapidly and selectively taken up by the liver and excreted slowly into the bile. One hour after injection of Tc-99m-ADM, 54.2 (± 4.4)% of the dose was detected in the liver whereas only 0.1 and 0.002% was found in stomach and thyroid respectively. A minimal renal excretion was also noted. This is similar to the biodistribution pattern of unlabeled ADM. No stomach and thyroid activity was observed at prolonged times as evidence of in vivo stability. These findings suggest electrolytic labeling procedure, allowing an optimal generation of stannous tin under physiologic conditions, yields a highly pure and stable complexation of ADM with Tc-99m.

31782 (DOE/ER/61150–1, pp. 6) **Correlation of lipophilicity to biodistribution of Tc-99m labelled aminothiols.** Papadopoulos, M. (Radiopharmaceuticals Lab. R.C.P.S. Demokritos, Athens (Greece)); Chiotellis, E.; Varvarigou, A.; Mastrostamatis, S.; Cotsyfakis, C.; Vavouraki, H.; Stathaki, S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In the present study the relationship between the lipophilicity and the in vivo behavior of new technetium-99m diaminodithiol complexes was investigated. The ligands studied include a series of sixteen derivatives of N,N′-bis(2-methyl 1-2-mercaptopropyl)-2-methylpropane-1,2-diamine (DADT). Substitution in position 4 was carried out by alkyl pyrrolidinyl or piperidinyl groups. DADTs were labeled with $NaBH_4$ method and complexes formed were initially purified by extraction with chloroform. Before the administration to the animals, the ^{99m}Tc-DADT complexes were analyzed by HPLC and the partition coefficient (p.c.) of the isolated peaks was determined (octanol/phosphate buffer, pH = 7.4). Authentic technetium-DADT complexes synthesized in Tc carrier level, were used as standards for the identification of TcO^{+3} species in Tc-99m preparations. The brain uptake as well as the lung accumulation of the various ^{99m}Tc-DADT derivatives at 2 min p.i. are presented.

31783 (DOE/ER/61150–1, pp. 7) **Tumortropic metal-complexes at the crossroads between diagnosis and therapy - A radiopharmacologic reflection.** Schomaecker, K. (University Clinics, Cologne (Germany)); Franke, W.G.; Weiss, S.; Pinert, J.; Shukla, S.K.; Limouris, G.S.; Beyer, G.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

This paper reviews the research in the field of radiopharmacology of metal-ligand-complexes with radioactive central ion in the last ten years. The investigations, carried out mainly in close cooperation between radiochemists and nuclear medicine physicists, intended the elucidation of mechanisms which are responsible for the tumor accumulation of radioactive metals like ^{67}Ga, ^{167}Tm, ^{169}Yb or ^{90}Y, injected as metal-ligand-complexes. These tumortropic metals have been applied mainly as citrate complexes up to now. The main important problem in case of intravenous application of this metal citrate complexes is a strong radioactivity deposition not only in the tumor but also in liver, bone, and blood. The results are promising not only for tumor diagnosis but also for tumor therapy, as instead of gamma-emitting radionuclides in the applied complexes, therapeutic relevant nuclides are used, under the main condition that their chemical properties resemble those of ytterbium.

31784 (DOE/ER/61150–1, pp. 8) **Radioiodinated phospholipid ether analogs as noninvasive tumor imaging agents.** Plotzke, K.P. (Univ. of Michigan, Ann Arbor (United States)); Ruyan, M.; Gross, M.D.; Wahl, R.; Counsell, R.E.; Skinner, R.W.S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The authors have designed and synthesized radioiodinated analogs of phospholipid ethers in order to evaluate the ability of such compounds to localize in and thereby visualize animal and human tumors in vivo. Administration of [I-125]-rac-1-O-[12-(m-iodophenyl)dodecyl]-2-O-methylglycero-3-phosphocholine (NM-294) or 12-[3(I-125)iodophenyl]-dodecyl-phosphocholine (NM-324) to Sprague-Dawley rats with intramuscular Walker 256 carcinosarcoma showed the tumor to contain the highest concentration of radioactivity at 24 hours (15% and 11% of the dose, respectively). In addition, NM-294 and NM-324 have shown excellent tumor localization by gamma-camera scintigraphy in athymic mice bearing human tumors such as HTB 77 (ovarian adenocarcinoma), NCI 69 (small cell carcinoma), and HTB 63 (melanoma). The tumor imaging obtained in these models was particularly striking at 5 days or more post injection. Tissue distribution studies show tumor retention of each radiopharmaceutical as well as a relatively rapid loss from most non-tumor tissue.

31785 (DOE/ER/61150–1, pp. 9) **Uptake of radiolabeled 1-(2-deoxy-2-fluoroarabinofuranosyl)-5-halouracils by experimental tumors in vivo.** Wiebe, L.I. (Univ. of Alberta, Edmonton (Canada)); Knaus, E.E.; Iwashina, T.; Misra, H.; Lee, Y.W. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In the present study, pyrimidine nucleosides were modified at two sites. The common modification was to introduce fluorine at the 2-position of the sugar; the stereochemistry selected was the 2 'up,' or arabino, configuration. The second modification was the incorporation of the light to medium weight halogens. The halogens, with their bioisosteric 'natural' substituents given in parentheses, included F(H,OH), Cl ($H\text{-}>CH_3$), Br(CH_3) and I($CH_3\text{-}>C_2H_5$). For biological investigation, the compounds were labeled with ^{14}C for the 5-F nucleoside, and with ^{36}Cl, ^{82}Br and ^{131}I, respectively, for the heavier halogens. The radiolabeled 1-(2-deoxy-2-fluoroarabinofuranosyl)-5-halouracils were administered by i.v. injection into mice bearing transplanted tumors. Although these nucleosides are more resistant to phosphorolytic deglycosylation than the corresponding 2′-deoxyuridines or uridines, uptake of test compounds by target (tumor) tissue was not markedly improved compared to the corresponding natural nucleosides. Detailed biodistribution data are presented and discussed with respect to the biochemical and physicochemical properties of these compounds.

31786 (DOE/ER/61150–1, pp. 10) **Tumor-specific Y-90 species in solution for animal and human tumor therapy.** Shukla, S.K. (Hospital St. Eugenio, Rome (Italy)); Cipriani, C.; Argiro, G.; Hermes, R.; Schomaecker, K.; Taglia, L.; Hani, S.; Medici, T.; Xie, H.; Limouris, G.S.; Cristalli, M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The authors obtained Y-90 in stable and chromatographically and electrophoretically pure form in solution as cationic or anionic species. The total-body distribution of the radionuclide in animals with spontaneous tumors led them to find the tumor-specific formulation. Tumor affinity for Y-90 species was similar to that previously studied for Ga-67. Since the formation of stable and pure anionic Y-90 species was easier, they tried first the antitumor activity in anionic Ga-67 affine tumors: melanoma, mammary tumor, and osteosarcoma in mice, cats, and dogs. In all cases with repeated administration of Y-90 (3.7 MBq/10 Kg), complete regression of the tumor was obtained. No side-effect of the treatment was observed. Due to limited availability of Y-90 the authors could so far treat only two patients, one with osteosarcoma and the other with highly metastasized lung cancer. Regression of the tumor and no toxicity due to the radionuclide treatment were found. Antihepatoma antibody, hepama-1, labeled with pure Y-90 in solution gave chromatographically and electrophoretically pure Y-90-hepama-1 in solution. High affinity of Y-90-hepama-1 in human hepatoma cells and in human hepatoma xenografts in nude mice was observed.

31787 (DOE/ER/61150–1, pp. 11) **Evaluation of multiple-dose ^{153}Sm-EDTMP for bone pain palliation in cancer patients.** Kasi, L.P. (Anderson Cancer Center, Houston, TX (United States)); Fossella, F.; Podoloff, D.; Kim, E.E.; Holoye, P.; Crane, J.; Gordon, E.E. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In this study, the authors evaluated the in vivo biodistribution, pharmacokinetics and toxicity of multiple doses (4) of the radiopharmaceutical injected i.v. at 4 week intervals, in 12 pts with bone metastasis previously confirmed with ^{99m}Tc-MDP scans. The first 9 pts received 0.5 mCi/kg dose at each interval, and the next 3 have received 1.0 mCi/kg. Serial blood and urine samples were collected for up to 24 hours after injection to determine blood and urinary clearance rates. CBC, platelet, Ca^{++} and Mg^{++} levels were also assayed. Whole blood gamma camera images were obtained at 24 hours post injection. Results indicate that the radiopharmaceutical clears very rapidly from the blood ($t1/2 = 3.7 \pm 0.5$ hrs.), and that less than 1% of the injected dose remains in circulation at 4 hours post injection. About 40-60% of the injected dose is cleared in the urine by 8 hours, and the remaining dose is almost completely taken up by the skeletal system. Gamma camera images at 24 hrs indicate that the tumor:background ratios were superior with ^{153}Sm-EDTMP than with ^{99m}Tc-MDP (5.3 vs 3.4). Additionally, renal or bladder activity was very minimal or absent with ^{153}Sm-EDTMP.

31788 (DOE/ER/61150–1, pp. 13) **Purification of radiolabeled monoclonal antibodies to angiotensin-converting enzyme significantly improves specificity and efficacy of its targeting into the lung.** Danilov, S. (USSR Cardiology Research Center, Moscow (Russian Federation)); Hiemisch, H.; Gavrilyuk, V.; Atochina, E.; Slinkin, M.; Torchilin, V.; Muzykantov, V. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Previously it was shown that mouse monoclonal antibody (MoAb) to angiotensin-converting enzyme (ACE), named 9B9, radiolabeled with I-125, In-111 and Tc-99m accumulates in the lungs of rat, hamster, cat, monkey and human very efficiently and specifically. Since ACE is localized on the luminal surface of vascular endothelial cells, the authors propose that the damage of the lung microvascular endothelium might affect the level of MoAb 9B9 lung accumulation. Indeed, as it was shown recently, specific pulmonary uptake of MoAb 9B9 is decreased upon all types of studied animal models of lung injury. From this set of experiments they have concluded that MoAb 9B9 lung accumulation is a sensitive marker of lung vessel injury. The second part of this study was an optimization of labeling/purification procedures for MoAb 9B9 and evaluation of its stability and efficacy of lung targeting. Stability and immunoreactivity of the modified and purified radiolabeled MoAb 9B9 were assessed by both in vitro and in vivo antigen (ACE)-binding assay. Radiolabeled MoAb 9B9 were purified by (1) adsorption chromatography on cellulose, (2) HPLC (gel filtration), (3) affinity chromatography on ACE-Sepharose. The best result was obtained with cellulose.

31789 (DOE/ER/61150–1, pp. 14) **$Ga(NO_3)_3$ uptake by human-derived small cell lung cancer cells.** Weiner, R.E. (UCONN Health Center, Farmington, CT (United States)); Avis, I.; Neumann, R.D.; Mulshine, J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

To attempt to identify, using ^{67}Ga, a set of patients with small cell lung cancer (SCLC) that might benefit from therapeutic doses of $Ga(NO_3)_3$, the role of transferrin receptors (TFR) in the uptake mechanism has been examined in 4 SCLC cultured cell lines, H209, H345, N417, and H82. TFR number and affinity constant at equilibrium was determined for each line. Cells ($2\text{-}6 \times 10^6$/mL) were incubated up to 166 hr with 30 μg/mL $Ga(NO_3)_3$ plus ^{67}Ga in the presence of 0, 0.1, 1, 10 μg/mL of transferrin (TF). At various time points aliquots were removed cell uptake cell number [ng/10^6cells] and viability were determined. Uptake rapidly increased in the first 17 hr for all cell lines and then leveled off. Viability was important for Ga uptake. As the cells died, the rate of incorporation decreased but the Ga remained in the cells. At 0.5 and 1 hr, H345 cells showed a TF-dependent uptake that was not quite significant ($P < 0.1$), N417 showed typical TF-independent uptake (decrease with TF increase), H209 and H82 showed no significant effect of the TF concentration. If uptake was averaged during the level time points in the absence of TF, cell lines H209 (233 ± 12) and H345 (237 ± 23) cells had a 4-5-fold greater uptake compared to H82 (54 ± 3) and N417 (52 ± 10) which was highly significant ($P < 0.001$).

31790 (DOE/ER/61150–1, pp. 15) **Pertechnetate solutions: Their history and the labelling of HMPAO.** Billinghurst, M.W. (Health Sciences Centre, Winnipeg, Manitoba (Canada)); Abrams, D.N.; Vaziri, F. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Although technetium-99m HMPAO has been shown to be a very useful radiopharmaceutical, its labeling efficiency and stability appear to be sensitive to the history of the pertechnetate solution. The manufacturer recommends limitations on both the time between generator milkings and the time between milking the generator and its use to label HMPAO. This suggests concern for the amount of chemical technetium-99 added to the kit, and concern with respect to the presence of radiolysis products in the pertechnetate solution used. Other concerns such as the volume of the pertechnetate solution used do not appear to be of primary significance. The study was designed to obtain pertechnetate solutions containing different levels of technetium-99 and different levels of oxidation products in order to identify the significant factor. In all cases the pertechnetate solutions used in this study were obtained from a MEK liquid-liquid extraction system. In all preparations the radioactivity was maintained at 1.0 ± 0.1 GBq.

31791 (DOE/ER/61150–1, pp. 16) **Technetium labelled somatostatin a potential agent for in vivo tumor localization.** Cox, P.H. (Dr. Daniel den Hoed Cancer Centre, Rotterdam (Netherlands)); Pillay, M.; Schoenfeld, D.H.W. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The combination of technetium with somatostatin as carrier molecule is an interesting potential radiopharmaceutical. Somatostatin is incubated with a solid phase electron donor to reveal the sulphohydryl groups. Sodium pertechnetate is then added and the mixture incubated at room temperature to facilitate labeling. Labeling efficiencies of ± 90% were obtained while free technetium binds to the electron donor leaving only labeled complex in solution. Following intravenous administration into rats bearing colorectal carcinoma a rapid blood clearance was observed with accumulation in liver, kidneys and bladder. Tumor uptake was maximum at ± 4 min post injection and despite a continued fall in blood levels there was no leaching of activity from the tumor. Tumor to muscle uptake ratios were 5:1 which compared favorably with those of 3:1 reported for the labeled analogues. The relationship of tumor uptake to somatostatin binding was confirmed by blocking somatostatin receptors with suramine whereby tumor uptake was suppressed.

31792 (DOE/ER/61150–1, pp. 18) **^{188}Re-EDTMP,, ^{188}Re-MDP, ^{188}Re-DMSA - The radiochemistry and radiopharmacology of the new potentially useful therapeutical agents.** Nikula, T.K. (MAP Medical Technologies Inc., Espoo (Finland)); Hiltunen, J.V.; Penttilae, P.I.; Bergstroem, K.; Mussalo, H.; Kuikka, J.T.; Laensimies, E. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Rhenium radioisotopes (Re-186, Re-188) have been suggested for clinical use in therapeutical applications. ^{188}Re can be obtained from generator and thus it is available as carrier-free isotope. The chemistry of Re resembles closely technetium chemistry. ^{188}Re decays by β^- emission with energy of 1,45 to 2,1 MeV. These facts make ^{188}Re very attractive radiolabel for therapeutical applications. The commercially available kits can directly be used for radiolabeling with very high specific activity ^{188}Re based upon generator. However, the preparations should be incubated in water bath for over 30 mins to facilitate and speed the reduction of perrhenate to oxidation state +5. The authors' chromatographic results suggest that the labeling takes place quantitatively. The labeling does not seem to be very pH dependent in slightly acidic area. In case of EDTMP labeling a modest, 10-fold excess of reduction agent ($SnCl_2$) seem to be adequate. This labeling is pH dependent; optimal, quantitative yields are obtained around pH 4 and yields decrease sharply to both ways. When ^{188}Re complexes were analyzed, only one radioactive complex was seen. No higher molecular weight radioactive components could be detected in size exclusion HPLC in any of these compounds.

31793 (DOE/ER/61150–1, pp. 19) **In-111-acetylacetone-cyclodextrin inclusion complex: A new form of radiopharmaceutical.** Wang, T.S.T. (Columbia Univ., New York, NY (United States)); Fawwaz, R.A.; Fleishman, M.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Tc-99m sodium pertechnetate, Tc-99m-HMPAO, Tc-99m-DTPA, In-111-oxine, In-111-tropolone, In-111-DTPA, and In-111-acetylacetone (1) were mixed with aqueous alpha-CD solution at 1:5 uM/uM ratio. Each solution mixture was monitored and assayed by TLC, ITLC, HPLC, and organic solvent extraction to assay the purity of the final product. The results found that among all those studied, only (1) was able to form a stable inclusion complex with alpha-CD (2) under these conditions. Based on this finding, a derivative of alpha-CD; 6-amino-6-deoxy-CD (3) was prepared. The chemical structure of (3) was confirmed by TLC, IR, NMR, and elemental analysis. (3) and In-111 and (1) were mixed to form an inclusion complex, which was first reacted with N-5-azido-2-nitrobenzoxyloxysuccinimide in 0.1M PBS, pH 8.0. Anti-melanoma MAbTP41.2 was then added to the mixture, and photoaffinity labeling was performed by flashing the mixture with UV light (320-400nm). The final product (4) was purified on a Sephadex G-50 column and eluted with 0.1M PBS pH 7.4. In-111-DTPA-MAb-TP41.2 (5) was also prepared as a control.

31794 (DOE/ER/61150–1, pp. 20) **Indium-111 labelled cationic complexes of aminothiols. Structure-activity correlation.** Cotsyfakis, C. (R.C.P.S. Demokritos, Athens (Greece)); Varvarigou, A.D.; Papadopoulos, M.; Stathaki, S.; Vavouraki, H.; Mastrostamatis, S.; Chiotellis, E. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Recent studies demonstrated that aminothiols with radiometals, form cationic complexes, that present myocardial uptake. In the present study the authors have prepared a series of N_2S_2 ligands of the formula $HS\text{-}C(RR)\text{-}CH_2NH\text{-}X\text{-}N(R')\text{-}CH_2\text{-}C(RR)\text{-}SH$ where: (A) $R = CH_3$, $X = C(CH_3)_2\text{-}CH_2$, $R' = H$ (1), R' = ethylpyrrolidinyl (2), R' = ethylpyrrolidinyl-3-benzyl (3), (B) $R = CH_3$, $X = CH_2\text{-}C(CH_3)_2\text{-}CH_2$, $R' = H$ (4), $R = C_2H_5$, $X = CH_2\text{-}C(CH_3)_2\text{-}CH_2$, $R' = H$ (5). Synthesis has been reported elsewhere. The formation of cationic complexes was investigated by comparative titration of the ligands with and without $In(NO_3)_3$. Labeling was performed by heating an aqueous solution of the ligand with carrier-free indium chloride at pH = 3.0-3.5. Analytical control indicated that all the compounds studied, form cationic indium complexes in high yield, which remained stable in vitro for 24 hrs. Biodistribution studies were performed initially in mice. Comparative data, 20 min p.i. are presented.

31795 (DOE/ER/61150–1, pp. 22) **Radiopharmacology of inhaled Xe-133 in skeletal sites containing deposits of Gaucher cells.** Castronovo, F.P. Jr. (Brigham and Women's Hospital, Boston, MA (United States)); McKusick, K.A.; Doppelt, S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Gaucher Disease is a lysosomal storage disease in which cells of the reticuloendothelial system accumulate the lipid glucocerebroside. It is characterized by slowly progressive visceral and osseous involvement. One of the latter manifestations include lipid infiltration of bone marrow. The authors monitored the rate of inhaled Xe-133 uptake and washout over diseased and normal metaphysical and epiphysial areas of the knee. Twenty three patients (14 adults, 8 children) with various degrees of Gaucher Disease were positioned supine under a gamma camera interfaced to a computer system. All patients rebreathed Xe-133 gas from a closed system for 10 minutes followed by 14 minutes of washout. Digitized images of the lung, liver, spleen, bony sites and soft tissues were obtained at 1 minute intervals during the equilibrium and washout phases. Counts for each ROI were normalized per 100 pixels and plotted as 'counts per ROI' as a function (TIME). Maximum uptake was also calculated by relating the counts/ROI/100 pixels to the 10 minute integrated lung count per 100 pixels during equilibrium; the administered 'dose'. The rate and % uptake per ROI were related to the degree of Gaucher Disease in bone. Liver and spleen uptake was observed to be minimal. Monophasic and diphasic washout curves were observed with the latter directly related to the extent of disease. Skeletal Gaucher Deposites released the Xe-133 with a greater rate (< T1/2) relative to soft tissue.

31796 (DOE/ER/61150–1, pp. 23) **Pharmacological properties of lisuride radiolabeled derivatives used for in vivo imaging of D2 dopamine receptors.** Loc'h, C. (CEA Hopital d'Orsay (France)); Maziere, B.; Stulzaft, O.; Ottaviani, M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

It has been recently demonstrated that the halogeno derivatives of lisuride, 2-bromolisuride (BLIS) and 2-iodolisuride (ILIS) possess definite antidopaminergic properties. For imaging in vivo dopamine D2 receptors these antagonists have been respectively labeled with 76Bf for PET studies and with 123I for SPECT investigations. The affinity and selectivity of 76Br-BLIS and 123I-ILIS for dopamine receptors have been investigated in vitro and in vivo in rats. In vitro the binding of 76Br-BLIS and 123I-ILIS to rat striatal membranes or brain slices is inhibited, in the nanomolar range, only by the known D2 antagonists. Their inhibition constants (Ki) are respectively .38 and 10 nmol/l for 76Br-BLIS. Compounds known to interact with other receptors do not possess any appreciable potency for preventing BLIS and ILIS binding. In vivo, the same selectivity has been demonstrated. The prevention of 76Br-BLIS and 123I-ILIS uptakes by various brain structures has been analyzed post mortem in rats.

31797 (DOE/ER/61150–1, pp. 24) **Quantification of ^{76}Br-bromolisuride binding to central dopamine D2 receptors studied in baboon by PET.** Maziere, B. (CEA Hopital d'Orsay (France)); Loc'h, C.; Delforge, J.; Hantraye, Ph.; Khalili-Varasteh, M.; Maziere, M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

76Br-Bromolisuride (76Sr-BLIS), an ergoline derivative, is a dopamine D2 receptor radioligand with pharmacological characteristics extensively studied in rodents. In vivo quantification of striatal D2 receptors binding parameters with 76Br-BLIS have been successfully obtained in baboon by PET using kinetic and equilibrium models. The saturation model determined under different conditions of receptor occupancy (variation of injected mass of BLIS) provides separate measurements of receptor density (Bmax = 49 ± 2 pmol/g) and receptor affinity (Kd = 1.7 ± .3 nM). The relative contribution of the free, non specifically and specifically bound fractions in the total in vivo binding measured by PET have been determined in preliminary ex vivo measurements. In vitro 76Br-BLIS binding parameters measured on baboon striatal membranes are compared with in vivo data and the apparent discrepancies between the results are discussed. These models are used to justify the index of specific binding used in clinical situations.

31798 (DOE/ER/61150–1, pp. 25) **Interaction of triazolam with central type benzodiazepine receptors studied in living baboons using positron emission tomography.** Bottlaender, M. (CNRS URA 1285, Orsay (France)); Brouillet, E.; Fournier, D.; Khalili-Varasteh, M.; Hantraye, Ph.; Maziere, B.; Maziere, M.; Sitbon, R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

This study aimed to determine in vivo in primates (1) the binding characteristics of triazolam and (2) its potency and intrinsic efficacy. Specific and selective labeling of central type BZR was performed in baboons by i.v. administration of ^{11}C-flumazenil, a benzodiazepine antagonist labeled with a positron emitting radionuclide. BZR fractional occupancy by triazolam was assessed using positron emission tomography (PET) by measuring the in vivo cerebral displacement of the brain radioactivity by increasing doses of triazolam. The anticonvulsant efficacy of triazolam was evaluated using electroencephalographic (EEG) recording by assessing its ability to counteract the central effect of an infusion of pentylenetetrazol (PTZ), a non competitive GABA antagonist acting at the picrotoxine site of the GABA-BZ-receptor complex. The simultaneous use of these two non invasive techniques allowed the authors to determine in vivo the anticonvulsant intrinsic efficacy of triazolam. In conclusion their results show that triazolam interacts in vivo with the BZR to induce its benzodiazepine agonist effects and that it does not recognize BZR subclasses. Moreover, triazolam is very potent in displacing ^{11}C-flumazenil from its binding sites and displays a strong anticonvulsant positive intrinsic efficacy. These two properties allows a better understanding of the clinical activity of triazolam.

31799 (DOE/ER/61150–1, pp. 26) **Intrinsic efficacies of benzodiazepine receptor ligands evaluated in vivo by positron emission tomography in the primate brain.** Brouillet, E. (CNRS URA 1285, Orsay (France)); Bottlaender, M.; Chavoix, C.; Khalili-Varasteh, M.; Yorke, J.C.; Maziere, M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The authors report the first such in vivo study in baboons. The receptor studied was the central type benzodiazepine receptor (BZR), an allosteric modulatory site on the $GABA_A$ receptor-chloride channel. Positron emission tomography (PET) was used to assess fractional BZR occupancy in the brain after systemic administration of BZR agonists (diazepam, Ro16-6028) and inverse agonists (Methyl β-carboline and Ro15-4513). The BZR was radiolabeled in vivo by using the radioligand [^{11}C]flumazenil, a highly potent and specific BZR antagonist. The fractional BZR occupancy was measured as the displacement of [^{11}C]Ro15-1788 binding in brain after administration of the unlabeled BZR ligands. PET was combined with simultaneous electroencephalography (EEG) to determine the pharmacological effect initiated by the occupancy of the BZR. The anticonvulsant or proconvulsant effects produced by the unlabeled BZR ligands were measured as their modulatory effects on the convulsant threshold dose of pentylenetetrazol, a non-competitive GABA antagonist acting at the picrotoxin site of the $GABA_A$ receptor chloride channel.

31800 (DOE/ER/61150–1, pp. 27) **Radiopharmacology of new diiodo analogs of calichemicin fragment.** Patel, H.B. (Univ. of Connecticut Health Center, Farmington (United States)); Hosain, F.; Spencer, R.P.; Skulski, M.S.; Scharf, H.D. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The present study involved preparation of diiodo analogs (IIA and IIB) from the above benzylated monoiodo compound by direct iodination using chloramine-T and iodine-131. The reaction yielded two labeled products at a ratio of about 2:1. The major component, methyl 4-benzyloxy-2-hydroxy-3,5-diiodo-6-methyl benzoate (IIA), was a product of radioiodination of the benzene ring at position 5. To the authors' knowledge, there has been no mention of this diiodo compound in the literature. The second product (IIB) is probably due to radioiodination of the benzyl ring which requires further characterization. These compounds were separated by reverse-phase TLC. Tissue distribution studies were carried out in mice with both labeled compounds, and compared with that of the parent monoiodo-compound labeled by I-131 exchange reaction. Mice were sacrificed at 3 and 10 min, and at 1, 4 and 24 hours following intravenous injection of tracer doses. Various organs (including the brain) were obtained, and assayed for radioactivity. Results were expressed as % dose/organ. The tissue distribution pattern was similar for the three radiolabeled compounds.

31801 (DOE/ER/61150–1, pp. 29) **Mapping histone4 mRNA in pig brain with In-111 labeled anti-sense oligo-nucleotide by in-situ hybridization.** Dewanjee, M.K. (Univ. of Miami, FL (United States)); Ghafouripour, A.K.; Werner, R.K.; Dietrich, W.D.; Gupta, R.; Glenn, S.; Serafini, A.N.; Sfakianakis, G.N. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The aminohexyl-oligonucleotide (AHON) was synthesized by conjugating the aminohexyl moiety to the 5′ end of oligonucleotide and coupled with DTPA-isothiocyanate, DTPAI (1/50) and 20 micrograms of DTPA-AHON were chelated with 37-370 MBq (1-10 mCi) of In-111-Chloride. The free In-111 was removed by gel-filtration. The brain of pigs was harvested and fixed with a solution of 40% formaldehyde, glacial acetic acid and methanol for 3 days at room temperature. Thin coronal sections (1 mm) were incubated for 3 hours with 50 microcuries of In-111 AHON and washed with a gamma camera fitted with a pin-hole collimator. The ratios of radioactivity of gray and white matter were determined with gamma counter. The scinti-photos demonstrated neuronal histone4 mRNA in the cerebral cortex. The results of relative radioactivity ratio of grey matter/white matter was 5 ± 1, specific activity and labeling efficiency. The gamma-emitting probe provided a simple and sensitive tool for mapping the neuronal mRNA. This in-situ hybridization technique could be applied for mapping mRNAs, specific for neurotransmitters and membrane proteins of all tissues and all species including tissues from human patients.

31802 (DOE/ER/61150–1, pp. 30) **Tc^{99m}-LDL as tracer for LDL-receptor mediated processes.** Leitha, T. (Univ. Vienna (Austria)); Huettinger, M.; Staudenherz, A.; Angelberger, P.; Dudczak, R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Tc^{99m}-LDL was compared with I^{125}-LDL to determine its possible role as tracer for quantitative in vivo assessment of LDL-receptor mediated processes. LDL was prepared from human plasma by sequential ultracentrifugation. The iodine monochloride method was used for I^{125} labeling. Tc^{99m} labeling was performed using the following optimized parameters: LDL (4-6 mg/ml); Tc^{99m}O$_4^-$ (40-80 mCi/ml) 0.3-0.6 × 10^{-6} M; $Na_2S_2O_4$ 0.02M; phosphate puffer. Tc^{99m}-LDL was isolated and purified by a combination of preparative HPLC on size exclusion columns (SEC) and subsequent dialysis for 2-6 hours in saline, 0.01mM EDTA. No significant differences between I^{125}- and Tc^{99m}-LDL were observed in simple displacement assays in fibroblasts and HepG2-cells with a 20-fold excess of cold LDL. However, comparing the biological activity in 37C uptake assays, differences between both tracers suggested an additional binding/internalization process for Tc^{99m}-LDL, possibly due to uptake of a fraction of the tracer which was altered by the labeling process. The biological relevance was tested in homozygote Watanabe heritable hyperlipidemic rabbits (WHHL) and New Zealand White rabbits (NZW), which differ in their LDL-receptor activity. In each model I^{125}- and Tc^{99m}-LDL had different plasmakinetics. I^{125}-LDL declined monoexponentially, whereas Tc^{99m}-LDL followed a biexponential function.

31803 (DOE/ER/61150–1, pp. 32) **Hepatic uptake of a radiolabeled monoclonal antibody is not receptor-mediated.** Boyle, C.C. (St. Bartholomews Hospital, London (United Kingdom)); Paine, A.J.; Mather, S.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

When Indium-111 labeled antibodies are employed for radioimmunodetection, a high degree of hepatic uptake is normally observed. This uptake by normal liver makes the detection of tumors or metastases within or in close proximity to the liver very difficult. It also reduces the amount of radiolabeled antibody available for tumor targeting, and when therapeutic isotopes are employed, the radiation dose to the liver may be significant. If radioimmunodetection is going to reach its anticipated clinical potential then it is or utmost importance to gain further understanding of the mechanism responsible for the high liver background. The intrahepatic biodistribution of an ^{111}In labeled mAb (HMFG1), was determined following intravenous administration to normal male rats. Two hours post administration, the liver contained 15% of the injected dose with most of the remaining radioactivity in the blood. The hepatic burden of the ^{111}In-mAb remained constant over the next 72 hours in the face of decreasing blood levels of radioactivity as well as its urinary and fecal excretion. At 2 and 72 hours post injection 50% and 10% respectively of the hepatic radiolabel was due to blood borne antibody.

31804 (DOE/ER/61150–1, pp. 33) **Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts.** Janoki, Gy.A. (National F.J.C. Research Inst. for Radiobiology and Radiohygiene, Budapest (Hungary)); Koroesi, L.; Szabo, J.; Holland, J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Monoclonal antibody BW 431/26 recognizes an epitope of the carcinoembryonic molecule (CEA). A new technique for labeling anti CEA MoAb with technetium described by Schwarz et al. (1987) was used. The purpose of the present study was to determine labeling efficiency, stability of this MoAb and compare biodistribution and kinetics with ^{111}In-DTPA-anti CEA F(ab′)2 in mice bearing CEA positive human tumor xenografts. Whole body autoradiography methods have also be applied in order to examine specific and nonspecific localization of labeled anti CEA MoAb in the animal tumor model. The autoradiographic record of [^{14}C]-thymidine incorporation in rapidly proliferating tumor and nontumor tissues of this same animal subject was obtained by simultaneous i.v. injection of [^{14}C]-thymidine. Radiochemical purity and stability was determined with TLC and radio HPLC. Examinations were made with the BIO-RAD HPLC system. Separation was performed on 300 × 7.5 mm Bio-Sil TSK-250 column for molecular size exclusion. Samples were eluted with 0.02 M NaH_2PO_4/0.05 M Na_2SO_4 buffer of pH 6.8 at a flow rate of 1 ml/min. Gamma radiation was measured with a flow through gamma ray detector. During polyacrylamide gel electrophoresis (PAGE) samples were applied to 7.5% non reduced gel 0.2 M phosphate buffer of pH 7.6. Electrophoresis was carried out at 4 mA per tube at +4C for 24 hrs.

31805 (DOE/ER/61150–1, pp. 34) **Preliminary studies on the metabolism of Tc-99m MAb-170.** Sykes, T.R. (Univ. of Alberta, Edmonton (Canada)); Noujaim, A.A.; Woo, T.K.; Wong, V.C.; Xue, Y.; MacLean, G.D.; McEwan, A.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In order to study the metabolism of this radioimmunopharmaceutical the authors have used simple chromatographic analyses of selected tissue homogenates to separate and characterize the species. Conventional inbred mice were injected with whole MAb-170 (~ 20 μg) modified by a reductive process and radiolabeled with Tc-99m. At six and twenty-four hours post administration the animals were sacrificed and samples of the kidney, liver, blood and urine were obtained. The soft tissues were crudely homogenized with a small amount of saline and the supernatant fraction separated for analysis. All samples were analyzed by ITLC and by Sephacryl S-200 size exclusion chromatography. The results indicate almost all of the soluble Tc-99m radioactivity is associated with apparently intact IgG, which is present as the predominant species (> 75%) in the serum, liver, and kidney of the animals at both time periods. Several smaller molecular weight metabolites can be observed in the urine, which make up a large proportion of the radioactivity, with both protein-bound and free Tc-99m complexes present.

31806 (DOE/ER/61150–1, pp. 35) **Effect of DTPA molecules conjugated to lysine residues on metabolism of I-125 and Tc-99m labeled T101.** Kinuya, S. (National Institutes of Health, Bethesda, MD (United States)); Jeong, J.M.; Paik, C.H.; Lim, S.M.; Camera, L.; Le, N.; Neumann, R.D.; Reynolds, J.C.; Carrasquillo, J.A. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The purpose of this research was to investigate if the conjugation of DTPA (negatively charged and branched) molecules to antibody affects the metabolism of I-125 and Tc-99m labeled antibody especially in liver of normal mice. Monoclonal antibody T101 (anti-CD5, IgG2a) was radiolabeled either with I-125 using chloramine-T method or with Tc-99m via a Tc-99m exchange labeling using Tc-99m glucarate after T101 was partially reduced with 2-mercaptoethanol. Cyclic DTPA dianhydride method was used for the conjugation of 10 DTPA molecules per T101. For the Tc-99m labeling, 200 times molar excess free EDTA or DTPA to T101 was added to the labeling solution to prevent the Tc-99m binding to a low affinity site and the DTPA moiety of T101-DTPA conjugate. Size exclusion HPLC was used for the purification of the labeled antibody and the analysis of the metabolites. The radiolabeled monomeric antibody preparations with a 60 to 85% immunoreactivity were injected iv into normal mice. The labeled antibodies used for this study were stable in serum in vitro over 1 day experiment. The biodistributions of I-125 T101 and Tc-99m T101 were similar except that Tc-99m T101 was retained in kidneys in a higher concentration. Both I-125 and Tc-99m activities were eliminated from body primarily into urine (30% ID at 26 hr).

31807 (DOE/ER/61150–1, pp. 36) **The stability in liver homogenate of In and Y anti-CEA antibody radiolabeled via DTPA and SCN-Bz-DTPA.** Mardirossian, G. (Univ. of Massachusetts Medical Center, Worcester (United States)); Wu, C.; Hnatowich, D.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Elevated liver radioactivity levels in patients of ^{111}In, and probably ^{90}Y, following administration of antibodies radiolabeled with these radionuclides has been attributed to instability of the chelates with diethylenetriaminepentaacetic acid (DTPA) as conjugated to antibodies via the cyclic anhydride (cDTPA). As an alternative, antibodies have also been radiolabeled with both radionuclides via a chelator prepared by conjugation with isothiocyanatobenzyl-DTPA (SCN-Bz-DTPA). It has been suggested that use of this latter chelator should diminish chelate instability and result in a corresponding decrease in ^{111}In and ^{90}Y levels in liver. In this investigation, the anti-CEA antibody C110 was conjugated via both cDTPA and SCN-Bz-DTPA and radiolabeled with both ^{111}In and ^{90}Y. All four preparations were added to fresh mouse liver homogenates and incubated at 37C in a CO_2 incubator for 48 hours. Size exclusion HPLC, anion exchange DEAE column and TLC were used to analyze the soluble fractions of each homogenate. In the case of ^{111}In, analysis by HPLC showed that the label in the soluble fraction was bound to antibody with 70% and 40% for the cDTPA and SCN-Bz-DTPA, respectively, at 48 hours. The remaining radioactivity was present on low molecular weight catabolites. Using TLC and two solvent systems, it was shown that the major catabolite was free ^{111}In-DTPA (in the case of cDTPA conjugated C110) and free ^{111}In-NH_2-Bz-DTPA.

31808 (DOE/ER/61150–1, pp. 37) **Strategies for pharmacokinetic modeling of monoclonal antibody biodistribution in man.** Mariani, G. (Univ. of Pisa (Italy)). Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Examples from published literature are chosen for this discussion illustrating the complexity and some of the problems most frequently encountered in pharmacokinetic modeling as applied to human studies on the tissue biodistribution of radiolabeled MoAb tracers for tumor immunoscintigraphy. This complexity of analysis arises from the complexity of the biological events involved in such studies, including not only the variable physiology of different normal tissues and of tumoral tissues, but also various radiochemical and radiopharmaceutical factors per se. It is also obvious that a major advantage in kinetic analysis is made possible by laboratory procedures allowing an accurate quantitative identification of the different radioactive species circulating in blood. From the kinetic point of view, special concern must be paid to the identifiability of complex multicompartmental models on the basis of experimental measurements in a relatively small number of compartments and/or with a poor temporal definition for each compartment. Finally, the goodness of fit achieved through the introduction of whatever number of additional compartments in the model used for analysis must always be combined with the main goal of assigning specific physiological and biological meanings to the kinetic parameters determined with the analysis.

31809 (DOE/ER/61150–1, pp. 38) **Clearance curve analysis of extravascularly distributed radiopharmaceuticals.** Blaha, V. (Charles Univ., Prague (Czechoslovakia)); Cihak, I.; Nicek, F. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The aim of this study has been to acquire the quantitative clearance parameter of the routinely used radiopharmaceuticals by kidney and hepatobiliary scintigraphy. This parameter is gained by the analysis of the clearance curve from the ROI of the heart and its surroundings. The parenchyma liver or kidney curves alone do not yield this global quantitative information. The curve of the above mentioned area represents the sum of 3 basic processes: (a) intravascular dilution, (b) extravascular dilution, and (c) clearance. In the 1st phase immediately after the administration of the radiopharmaceutical, all 3 processes take place; the intravascular dilution ceases first. The drop of the curve in the 2nd phase is determined by processes (b) and (c). After distribution in the extravascular space is concluded, the 3rd phase of the curve begins. In it, the speed of the drop is determined by the clearance of the pharmaceutical from the entire distribution space. In analyzing the curve, the first 2.5 min after drug administration is left out, as the influence of intravascular dilution on the decrease of the curve basically ends at this time. The authors analyze only the following part of the curve, on which the drop is given only by processes (b) and (c).

31810 (DOE/ER/61150–1, pp. 39) **From pure radionuclide species in solution through pure radiopharmaceuticals and simple radiopharmacology to disease-specific nuclear medicine.** Shukla, S.K. (Hospital St. Eugenio, Rome (Italy)); Cipriani, C.; Argiro, G.; Hermes, R.; Taglia, L.; Hani, S.; Tarantino, U.; Schomaecker, K.; Limouris, G.S.; Osscini, L. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

By studying chromatographically and electrophoretically the nature of radionuclide species present in the radiopharmaceutical solutions and the radionuclide distribution in disease-bearing subjects, the authors observed that: (1) All radiopharmaceuticals commercially available for the same purpose (e.g., Ga-67) are not the same; (2) Chemical and consequently biological properties of the radiopharmaceutical change greatly within the useful period of the radiopharmaceuticals; (3) The disease-nonspecificity of the radiopharmaceuticals is due to the presence of several radionuclide species in the radiopharmaceutical solution or due to their instability in vitro and in vivo. The authors recognized the nature of the radionuclide species concentrating specifically in the disease under study, and found also the conditions under which it can be pure and stable. For tumor detection and therapy they chose Ga-67 and Y-90 respectively, which are chemically similar.

31811 (DOE/ER/61150–1, pp. 40) **Behavior of various radiochemical species present in Tc-99m labeled monoclonal antibody preparations.** Sykes, T.R. (Univ. of Alberta, Edmonton (Canada)); Noujaim, A.A.; Woo, T.K.; Erickson, C.L.; McEwan, A.J.; MacLean, G.D. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Monoclonal antibodies directed against tumor-associated components are useful carriers of radioisotopes for the detection and treatment of malignant disease. For diagnostic purposes the preferred radiolabel is Tc-99m because of its favorable imaging characteristics and availability. The process of attachment involves the reduction of pertechnetate to form a more chemically reactive species which is capable of binding to the native or modified protein. Depending on the reaction conditions used and the time of analysis several Tc-99m species can be observed in variable amounts. These minor constituents can be identified in the final preparation by careful radiochemical analysis. The authors have used standard chromatographic techniques to separate the various components and have studied their biodistribution in conventional mice. The expected pattern of tissue uptake is observed for typical species such as free pertechnetate but other low molecular weight complexes and protein-associated components have much different patterns of localization. The results of these studies and their significance on the overall biological behavior of the final preparation are presented.

31812 (DOE/ER/61150–1, pp. 41) **Comparison of methods for incorporating a radioiodinated residualizing cholesteryl ester analog into low density lipoprotein.** DeForge, L.E. (Univ. of Michigan, Ann Arbor (United States)); DeGalan, M.R.; Ruyan, M.K.; Counsell, R.E.; Newton, R.S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

^{125}I-Cholesteryl iopanoate (^{125}I-CI) is a nonhydrolyzable cholesteryl ester (CE) analog with properties favorable for tracing the disposition of lipoprotein-associated CE in vivo. Two different methods of incorporating ^{125}I-CI into LDL were evaluated insofar as their ability to yield a particle similar to native LDL. The first procedure was an organic solvent delipidation/reconstitution procedure described by Krieger et al. The second method involved incubation of detergent (Tween-20)-solubilized ^{125}I-CI with whole plasma followed by isolation of the LDL fraction by ultracentrifugation (D[^{125}I-CI]-LDL). In vitro analyses showed that neither procedure adversely affected apoprotein B-100 integrity or uptake by cultured fibroblasts. However, the reconstitution procedure produced LDL particles that were markedly heterogeneous in size whereas the D[^{125}I-CI]-LDL displayed a minimal size perturbation. Additional studies involved comparison of the plasma clearance and tissue distribution of the two preparations in guinea pigs, using radioiodinated LDL (^{125}I-LDL) as a control.

31813 (DOE/ER/61150–1, pp. 43) **Synthesis and evaluation of radioiodinated cholesteryl ethers as lipoprotein probes.** DeForge, L.E. (Univ. of Michigan, Ann Arbor (United States)); Ruyan, M.K.; Schwendner, S.W.; Counsell, R.E.; Newton, R.S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Two novel cholesteryl ether derivatives were synthesized and radioiodinated: (1) ^{125}I-cholesteryl m-iodobenzyl ether (^{125}I-CIBE) and (2) ^{125}I-cholesteryl 12-(m-iodophenyl)dodecyl ether (^{125}I-CIDE). These radioiodinated ethers were incorporated into low density lipoprotein (LDL) by incubating the compounds (solubilized in saline using Tween-20) with isolated LDL or with whole plasma. Such LDL preparations were taken up by cultured fibroblasts in a receptor-dependent manner similar to that of a radioiodinated LDL control. Upon injection into guinea pigs, ^{125}I-CIBE-labeled guinea pig LDL cleared from the plasma similarly to radioiodinated guinea pig LDL. The primary sites of ^{125}I-CIBE uptake were the adrenal and the liver, and the compound was stable to both hydrolysis and deiodination over 24 hours. In summary, ^{125}I-CIBE and ^{125}I-CIDE, like previously described tritiated cholesteryl ethers, appear to be potentially useful tracers of cholesteryl ester uptake. Moreover, these radioiodinated probes have the advantage of being more easily quantitated in tissue samples as well as being detectable by noninvasive scintigraphic imaging.

31814 (DOE/ER/61150–1, pp. 44) **Tc^{99m}-LDL kinetics in the isolated perfused rat liver.** Leitha, T. (Univ. Vienna (Austria)); Staudenherz, A.; Huettinger, M.; Angelberger, P.; Dudczak, R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The purpose of this study was to compare I^{125}-LDL and Tc^{99m}-LDL as possible tracers for quantitative assessment of receptor mediated LDL-uptake of the liver. LDL was prepared from plasma of healthy human donors by sequential ultracentrifugation. The iodine monochloride method was used for I^{125} labeling. Tc^{99m} labeling was performed by a modification of Lees et al. (J. Nucl. Med. 26; 1985). Tc^{99m}-LDL was isolated and purified from the reaction mixture by a combination of preparative HPLC on size exclusion columns (SEC) and subsequent dialysis for 2-6 hours in saline, 0.01 mM EDTA. Non-recirculating perfusions were performed for 120 min in the isolated liver of 9 Sprague-Dawley rats which received Tc^{99m}- and I^{125}-LDL simultaneously 90 minutes before perfusion. The perfusate contained calcium-free and blood-free Krebs-Ringer bicarbonate buffer, which was gassed continuously with O_2/CO_2 (19:1) and maintained at 37 ± 0.5C. Biliary isotope excretion and release of breakdown products via the liver vein was analyzed by protein precipitation with 20% trichloro-acetic acid and column chromatography.

31815 (DOE/ER/61150–1, pp. 45) **A simple method for producing a technetium-99m-labeled liposome which is stable in vivo.** Phillips, W.T. (Univ. of Texas Health Science Center, San Antonio (United States)); Klipper, R.; Blumhardt, R.; Rudolph, A.S.; Timmons, J.H. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

A new method for labeling preformed liposomes with technetium-99m (^{99m}Tc) has been developed which is simple to perform and stable in vivo. Previous ^{99m}Tc-liposome labels have had variable labeling efficiencies and stability. This method consistently achieves high labeling efficiencies (> 90%). A commercial available radiopharmaceutical kit - hexamethylpropylenamine oxime (HMPAO) is reconstituted with $^{99m}TcO_4^-$ and then incubated with preformed liposomes that encapsulate glutathione. Incubation takes only 15 minutes at room temperature. This method appears to be equally effective in multilamellar vesicles and small unilamellar vesicles. Both in vitro and in vivo studies indicate good stability of this label. Rabbit images show significant spleen, liver and bone marrow uptake without visualization of thyroid, stomach or bladder activity. The authors recently reported the development of this labeling method in liposomes that encapsulate both hemoglobin and glutathione. The glutathione was included in this preparation as an antioxidant for the hemoglobin. They initially believed that hemoglobin was important in the labeling process but further studies now show that liposomes containing only glutathione demonstrate equal labeling efficiencies and stability.

31816 (DOE/ER/61150–1, pp. 46) **Three-step ^{99m}Tc-biotin immunoscintigraphy in the diagnosis of glioma patients.** Paganelli, G. (Univ. of Milan (Italy)); Lucignani, G.; Magnani, P.; Zenorini, A.; Zito, F.; Messa, C.; Sudati, F.; Truci, G.; Terreni, M.; Giovannelli, G.; Fazio, F.; Maecke, H. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Imaging of gliomas can be obtained after the injection of I-131 labeled MoAbs directed against tenascin, an extracellular matrix antigen. The authors have developed a 3-step immunoscintigraphy method in order to improve the target to non target ratio. The anti-tenascin MoAb BC2 was biotinylated and 0.5 mg were administered i.v. in 12 patients, 4 with primary glioma 7 with recurrent glioma and one with cerebral hematoma, all histologically documented prior or after scanning. After 3 days, 5 mg of cold avidin were injected i.v. followed 2 days later by i.v. injection of 0.2 mg of PAO-biotin labeled with Tc-99m. No evidence of toxicity was observed. Blood concentration of [Tc-99m]PAO-biotin had a multi-exponential clearance with a fast component and a slow component. [Tc-99m]PAO-biotin was primarily excreted through the biliary system. Three h after the injection 43% of the dose was in the liver and 15% in the urine. Brain SPET was performed 60-120 min after the administration of [Tc-99m]PAO-biotin using a brain dedicated SPET system. Tumors were detected in 9 of the 11 patients with glioma, no uptake was observed in a patient with hematoma.

31817 (DOE/ER/61150–1, pp. 47) **Intratumoral injection of 5-^{125}I-iodo-2′-deoxyuridine in patients with colon cancer.** Mariani, G. (Univ. of Pisa (Italy)); Cei, A.; Collecchi, P.; Bevilacqua, G.; Guadagni, A.; Di Luca, L.; Di Stefano, R.; Salvadori, P.A.; Mosca, F.; Abbeele, A.D. Van den; Baranowska-Kortylewicz, J.; Adelstein, S.J.; Kassis, A.I. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The aim of the present work was to determine the in vivo specificity and metabolic fate of ^{125}IUdR in patients with colon cancer using a similar approach. A total of seven patients with colon cancer scheduled for ablative surgery were injected intratumorally with ^{125}IUdR during endoscopy 24 hours before surgery. Blood and urine samples were collected up to 72 hours after ^{125}IUdR injection. Following resection, the radioactivity of the tumor and the surrounding tissues was measured in a gamma counter, and microautoradiography was performed on semi-thin tissue sections to determine localization of the radiopharmaceutical at the cellular level. Activity in plasma peaked at 1 hour following ^{125}IUdR injection and decreased thereafter with a mean half-life of about 8 hours; HPLC analysis indicated 98-99% of the radioactivity was free ^{125}I, while about 70-75% of radioactivity recovered in urine was free radioiodine and about 25% undegraded ^{125}IUdR. An average 0.124% of the injected dose was present per gram of tumor and very high tumor to nontumor ratios were observed both for normal colon in the immediate vicinity of the injection and for normal colon 15 cm away from the injection site. Microautoradiography confirmed these high tumor to nontumor ratios and demonstrated that ^{125}IUdR was mainly incorporated in the tumor cell nuclei.

31818 (DOE/ER/61150–1, pp. 48) **Labeling, control and radiopharmaceutical evaluation of ^{99m}Tc-ADP as tumor seeking agent.** Leon, A. (Univ. de la Republica, Montevideo (Uruguay)); Rey, A.; Leon, E.; Kremer, C.; Chiozzone, R.; Lacava, C.; Nappa, A.; Vila, P.; Campos, E. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Labeling procedure, radiochemical controls, and radiopharmacological studies of ^{99m}Tc-ADP are described. A labeling technique with $SnCl_2$ as reducing agent was used and radiochemical purity was determined by chromatographic and electrophoretic separations. Toxicity studies and biological distribution at different times post injection (from 2 to 60 min) were developed in normal mice (CD1). The in vitro and in vivo complex stability was studied. Lipophilicity and human serum protein binding, as well as blood and urinary clearance in Wistar rats were determined for a better understanding of its in vivo chemical behavior. Evaluation of ^{99m}Tc-ADP as potential cancer diagnosis agent was done in mice (CD1 and C3H) bearing spontaneous mammary adenocarcinomas. Biodistribution studies revealed no specific high accumulation of the ^{99m}Tc-ADP in no particular organ, with a high renal clearance - $>$ 50% D at 30 min - and a simultaneous kidney activity of 8% D that remained constant at higher times. Data confirmed the lack or negligible amounts of ^{99m}Tc-red-hyd and free $^{99m}TcO_4^-$ as radiochemical impurities. Absence of free $^{99m}TcO_4^-$ in urinary excretion was demonstrated by chromatography. Blood clearance in rats adjusted to a bicompartmental model, with a short distribution phase of about 10 minutes. Renal excretion confirmed the behavior observed in mice. Percentage of injected dose per gram of tumor, and tumor-to-blood ratio were not notably high, however tumor-to-muscle ratio increase significantly with time from 1:1 at 30 min to 2.5:1 at 60 min.

31819 (DOE/ER/61150–1, pp. 49) **^{11}C-thymidine: An in-vivo tracer for cell proliferation.** Poupeye, E. (Lab. voor Medische Biochemie en voor Klinische Analyse, Gent (Belgium)); Leenheer, A. De; Goethals, P.; Eijkeren, M. van. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Early studies with ^{11}C-thymidine proved that it is a suitable tracer for tumor imaging due to an important uptake in fast-dividing tissue and a high tumor to tissue ratio. The interpretation of ^{11}C-thymidine images, however, requires a detailed knowledge of the in-vivo behavior of this radiopharmaceutical. Moreover, the ^{11}C-thymidine uptake in tumor tissue can only be an index for cell proliferation if a substantial part of the radioactivity is actually incorporated in the DNA. Therefore, the authors studied the biodistribution and DNA incorporation in fast-dividing tissues like duodenum and spleen, as performed in a number of healthy rats at different time intervals after intravenous injection. They also investigated the metabolization of ^{11}C-thymidine after intravenous injection in tumor patients. Preliminary results indicated that although ^{11}C-thymidine is very quickly metabolized after injection, a substantial DNA incorporation could be detected within the normal scan time. Several examples are presented proving the usefulness of ^{11}C-thymidine in this particular field of oncology research.

31820 (DOE/ER/61150–1, pp. 50) **Enhanced tumor imaging with PokeWeed Mitogen.** Bitner, D.M. (Univ. of New Mexico, Albuquerque (United States)); Mann, P.L.; D'Souza, P.; Eshima, D. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Traditional tumor imaging relies on molecule dependent target specificity; however it is hypothesized that the production of a specific image is possible by altering the rate of tissue clearance of a given radiotracer. PokeWeed Mitogen (PWM) as a biomodulator represents a class of molecules which regulate cellular differentiation and cell:cell interactions and may alter tissue clearance rates. Utilizing the B-16/C47B1/6 model, 7 days post transplantation, 19 animals were injected i.v. with 1-2 mCi of Tc-99m Human Serum Albumin (HSA). Twelve of these animals were given 10 ug of PWM i.p. at various intervals prior to HSA administration. The animals were imaged at various time intervals, up to 2 hours post HSA injection and sacrificed for biodistribution studies. In summary a 32% to 59% overall increase in the tumor to muscle ratio was observed in the PWM treated animals over non-treated controls. A 1 hour PWM pretreatment followed by 1 hour image and distribution study gave the best results.

31821 (DOE/ER/61150–1, pp. 51) **Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model.** Dewanjee, M.K. (Univ. of Miami, FL (United States)); Ghafouripour, A.K.; Kapadvanjwala, M.; Werner, R.K.; Ganz, W.; Glenn, S.; Gupta, R.; Serafini, A.N.; Sfakianakis, G.N.; Lopez, D.M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The gamma-emitting iodine-125 and indium-111-labeled antisense oligonucleotide permeable probes were developed for non-invasive imaging of histone4-mRNA transcript as a marker for tumor cell proliferation. The 25-mer nucleotide sequence for histone4-mRNA was selected from the GenBank: 5′-H_2N-$(CH_2)_6$-OPO_3-CT-TTG-CCA-AGG-CCC-TTC-CCG-CCT-TT-OH-3′. The aminohexyloligonucleotide (AHON) was synthesized by conjugating the aminohexyl moiety to the 5′ end of oligonucleotide and was coupled with DTPA-isothiocyanate (DTPAI) (1/50); 20 micrograms of DTPA-AHON were chelated with 37-370 MBq (1-10 mCi) of In-111-Chloride and free In-111 was removed by gel-filtration (Sephadex G-25, Pharmacia Fine Chemicals). At tenth day post-inoculation of mammary tumor cells (7) in the flank, the BALB/c mice (50 in five groups) were injected intravenously with 0.37 MBq (10 uCi), imaged with a gamma camera and sacrificed at 1, 3, 6, 24 and 48 hours post-injection. The tumor and other tissues were harvested, weighed and the radioactivity was measured with the gamma counter. The relative radioactivity ratios of tumor/blood and tumor/skeletal muscle were then calculated.

31822 (DOE/ER/61150–1, pp. 52) **Mitochondrial and sarcolemmal membrane potentials determine accumulation of the R and S stereoisomers of the technetium isonitrile complex $Tc(CNCH(CH_2CH_3)CH_2OCH_3)_6^+$.** Hwang, S.T. (Harvard Medical School, Boston, MA (United States)); Kronauge, J.F.; Piwnica-Worms, D. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Three Tc-99m-isonitrile complexes have demonstrated localization in human myocardium in proportion to blood flow. Perfused heart models have shown that the complexes are also viability agents and, more specifically, cultured cell models have demonstrated that both mitochondrial and sarcolemmal membrane potentials promote a nonmediated influx and net sequestration of one agent, Tc-MIBI, within the mitochondria in the steady-state. To further investigate this mechanism and begin exploring the generality of this property of Tc-isonitriles for use as SPECT viability agents, cultured chick heart cells were used to determine the potential-dependence of two new Tc-isonitriles showing enhanced myocardial images in animal studies relative to Tc-MIBI. The stereoisomers $Tc((R)\text{-}CNCH(CH_2CH_3)CH_2OCH_3)_6^+$ (RP 310) and $Tc((S)\text{-}CNCH(CH_2CH_3)CH_2OCH_3)_6^+$ (RP 311) showed myocellular accumulation approaching a plateau by 60-120 minutes to a level ~ 7 fold greater than Tc-MIBI. In preparations from the same culture, there was no significant difference between RP 310 and RP 311 in initial uptake rates or net accumulation at 100 minutes.

31823 (DOE/ER/61150–1, pp. 53) **Radiopharmacological studies of ^{99m}Tc-CPI: Experience with isolated rat atrial tissue.** Verdera, S. (Univ. de la Republica, Montevideo (Uruguay)); Leon, A.; Leon, E.; Souto, D.; Oliver, P.; Rodriguez, A.; Tamosiunas, G.; Esponda, A.; Kronauge, J.F.; Jones, A.G. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Different experimental models have been used to clarify the uptake and localization mechanism of potential myocardial perfusion agents. The authors have developed a technique of using freshly isolated rat atrial tissue to study extraction, washout and metabolic sensitivity of these technetium complexes. The atrial tissue model is free of blood component interactions and variations in coronary circulation. Also the exertion and oxygen supply of the contractile tissue can be monitored and controlled. Studies were performed on the lipophilic cation ^{99m}Tc-CPI, $[Tc(CNC(CH_3)_2COOCH_3)_6]^+$, reconstituted from a lyophilized kit containing $[Cu(2\text{-}carbomethoxyisopropylisocyanide)_4](BF_4)$, with $SnCl_2$ as the reducing agent. Atria were maintained at 32C in Krebs-Henseleit buffer continuously bubbled with an 95% O_2/5% CO_2 mixture. Contractile activity was controlled by frequency and contractility registration before and during experiments. Duplicate experiments were also performed at 4C to test for temperature dependence. Initial uptake and net accumulation were monitored by incubating atria at different ^{99m}Tc-CPI concentrations and for varying lengths of time up to 15 min. Atrial retention of accumulated activity was also investigated by monitoring washout into isotope-free buffer under control conditions. Control assays to determine tissue integrity and extracellular volumes were performed using $[^{99m}TcO_4]^-$.

31824 (DOE/ER/61150–1, pp. 54) **Radiopharmacological studies of a new functionalized isonitrile technetium complex: $[Tc(2\text{-ethoxy-2-methylpropylisonitrile})_6]^+$.** Barbarics, E. (National Research Inst. for Radiobiology and Radiohygiene, Budapest (Hungary)); Janoki, Gy.A.; Kronauge, J.F.; Jones, A.G.; Costello, C.E.; Davison, A. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. DOE Contract FG02-87ER60526. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Hexakis(2-ethoxy 2-methylpropylisonitrile)technetium, $[Tc(CNCH_2C(CH_3)_2OCH_2CH_3)_6]^+$ (Tc-EIBI) is a functionalized hexakis isonitrile complex of technetium(+1) structurally similar to but slightly more lipophilic than the commercial myocardial perfusion agent $[Tc(CNCH_2C(CH_3)_2OCH_3)_6]^+$ (Tc-MIBI). Preliminary biodistribution studies in rats indicated that this compound exhibits a distribution similar to Tc-MIBI with rapid extraction into normal myocardial tissue but slightly different pharmacokinetics in that it washes out of the heart more quickly. A better understanding of the mechanism of this clearance was sought to help interpret this distribution data. Dynamic gamma-camera imaging studies in rabbits showed good myocardial uptake with prolonged retention and rapid extraction into liver and kidneys. The global pharmacokinetics of this compound are favorable, with significant hepatobiliary accumulation (t_{max} = 11 min) and a rapid clearance ($t_{1/2}$ = 24 min) that improves the target to nontarget tissue ratio and in turn enhances visualization of the myocardium. RP-HPLC analysis of bile samples from four guinea pigs taken 60 min after injection of ^{99m}Tc-EIBI demonstrated a mean of 97.3 ± 3.0% of the parent radiopharmaceutical had been metabolized to six new technetium-containing species.

31825 (DOE/ER/61150–1, pp. 56) **Preparation and biodistribution of Tc^{III}-N,N′-ethylenebis (acetylacetone thioiminato) bis (triphenylphosphine) complex.** Vavouraki, H. (R.C.P.S. Demokritos, Athens (Greece)); Papadopoulos, M.; Mastrostamatis, S.; Varvarigou, A.; Chiotellis, E. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Introduction by Deutch and co-workers of technetium-N,N′-ethylenebis (acetylacetone iminato) complexes resulted in the development of new nonreducible, cationic Tc(III) agents, exhibiting significant myocardial uptake. In the present work the authors investigate the biological properties of the 'mixed-ligand' Tc^{III}-N,N′-ethylenebis (acetylacetone thioiminato) bis (triphenylphosphine) complex, $Tc^{III}\text{-}(sacac)_2en(PPh_3)_2$, containing both the tetradentate thioimine and the monodentate phosphine ligands. Technetium ^{III}-$(sacac)_2en(PPh_3)_2$ was prepared by reaction of $Tc^{V}\text{-}(sacac)_2en$ used as precursor, with excess phosphine in methanol. The $^{99}Tc^{III}$-complex was characterized by spectroscopic methods and HPLC. In order to study the biological behavior of $Tc^{III}\text{-}(sacac)_2en(PPh_3)_2$, synthesis was proceeded in carrier level with the same method mentioned above, using both Tc-99 and Tc-99m. Complexes were analyzed by UV-Vis and HPLC and administered in experimental animals (mice). The comparative data of the biodistribution study 10-90 min. p.i., are presented.

31826 (DOE/ER/61150–1, pp. 57) **Technetium-99m biguanide complexes: ^{99m}Tc-1,1-dimethylbiguanide.** Neves, M. (Lab. Nacional de Engenharia e Tecnologia Industrial, Sacavem (Portugal)); Gano, L.; Patricio, L. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

1,1-dimethylbiguanide (DMBG) was labeled with Tc-99m using stannous chloride as reductant at basic pH. Thus, to an aqueous solution containing 2mg of the ligand and 100μl of fresh $SnCl_2$ (1mg/ml) solution at pH = 8-10, the required amount of $^{99m}TcO_4^-$ was added. ^{99m}Tc-DMBG was monitored by paper and ITLC chromatography, electrophoresis and HPLC. The octanol-saline partition coefficient of the developed ^{99m}Tc preparation was 0.11 ± 0.02. Quantitative tissue distribution of ^{99m}Tc-DMBG were determined in 20-25 g Charles River female mice. The animals were sacrificed at various times after injection and the organs were weighed and the radioactivity measured. The ^{99m}Tc preparation has shown a rapid blood clearance which occurs through both the hepatobiliay and renal pathway. Brain and myocard uptake were not significant.

31827 (DOE/ER/61150–1, pp. 58) **A novel bifunctional chelating agent α,ε-N,N′-bis(L-cysteinyl)-L-lysine for radiolabeling of monoclonal antibodies with technetium-99m.** Li Bizhong (Peking Univ., Beijing (China)); Liu Yuanfang; Wu Yonghui; Ye Yunhua. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

A novel compound, substantially a diamidodimercaptide ligand, α,ε-N,N′-bis(L-cysteinyl)-L-lysine (BCL) was synthesized and characterized. It was then employed as a bifunctional chelating agent to chelate ^{99}Tc^{m} and subsequently conjugated to fragment F(ab′)$_2$ of anti-gastric tumor monoclonal antibody 3G9 with conjugating reagents EDC+HONCE. 83% of radioactivity was found to remain in the form of ^{99}Tc^{m}-BCL-Ab after storing in a solution of pH 7.0, 0.010 mol/L citrate buffer for ca. 20h. The immunoreactivity retained in ^{99}Tc^{m}-BCL-F(ab′)$_2$ was 93% assayed by ELISA method. The pharmacokinetics of the conjugates of ^{99}Tc^{m}-BCL and ^{99}Tc^{m}-BCL-IgG were studied in Swiss mice. At 24 hours post injection of ^{99}Tc^{m}-BCL-IgG, the value of %ID/g for liver, kidney and spleen was 6.98, 9.58, and 2.27 respectively. No accumulation in stomach was found. The in vivo behavior of the label was that of a typical radiolabeled IgG, although it exhibited a faster clearance in blood. The uptake of ^{99}Tc^{m} in kidney might be ascribed to the clearance of the label to this organ.

31828 (DOE/ER/61150–1, pp. 59) **Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study.** Castanheira, I. (National Center for Scientific Research Demokritos, Attiki (Greece)); Sawas-Dimopoulou, C. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Phosphomycine (Phos), a large spectrum antibiotic with preferential localization into the kidneys, can be labeled with Technetium-99m at various pH. However, the final pH in the labeling of Phos by ^{99m}Tc-pertechnetate in the presence of $SnCl_2$ seems to play a significant role in determining the biological properties of the final labeled product. Radiopharmacological characteristics of various forms of ^{99m}Tc-Phos obtained at pH 6.8, 4.5 and 2.5 were studied in mice, rats and rabbits. Significant differences in these products were shown by biodistribution studies in Balb C mice and Wistar rats and confirmed by whole-body autoradiographies in mice and γ-camera studies in rats and rabbits. ^{99m}Tc-phos pH 6.8 has a high uptake in kidneys from 2 min after inj. to 3 hr after injection and a rapid urinary excretion. Intrarenal pharmacokinetics studied by autoradiography showed a high concentration in the inner medulla at 1 min after inj. followed by an increased localization in kidney cortex, like ^{99m}Tc-DMSA. Preferential uptake in bones was shown by ^{99m}Tc-phos pH 2.5 from 5 min to 3 hr after inj. at the same time.

31829 (DOE/ER/61150–1, pp. 62) **Coupling of ^{125}I-EGF to serum albumin to stabilize the radioiodine bond: Radiolabeling, purification by HPLC, stability and biodistribution in mice.** Reidel, G. (Gesellschaft fuer Strahlen- und Umweltforschung mbH Muenchen, Neuherberg (Germany)); Ercan, M.T. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Rapid in vivo deiodination of ^{125}I labeled epidermal growth factor (EGF) was a major disadvantage in studies to localize EGF receptors in tumor implanted nude mice. The present investigation was undertaken to stabilize the radioiodine bond by coupling EGF to mouse albumin by the cyanuric chloride method of Sinn et al. Albumin coupled EGF was obtained in an overall efficiency of $\sim$ 30%. Free ^{125}I after HPLC purification and in vitro stability of both ^{125}I-EGF and ^{125}I-EGF-Alb was determined by ITLC-SG strips and saline as a solvent. There was $<$ 1% ^{125}I^{-} after passage through the HPLC column for both, but it increased up to 5 and 3% after storage at 4C for 5 days, respectively. ^{125}I-EGF and ^{125}I-EGF-Alb (0.2 ml, 740 kBq) were each injected to 25 NMRI mice. They were sacrificed in groups of 5 at 1, 3, 6, 24 and 48 h. The biodistribution of the two radiopharmaceuticals were different from each other. The liver and blood radioactivity levels were higher with ^{125}I-EGF-Alb compared to ^{125}I-EGF. $T_{1/2}$ for whole body retention was 1.5 and 14 h with ^{125}I-EGF and ^{125}I-EGF-Alb, respectively. The higher retention of coupled EGF might increase its tumoral uptake in nude mice. Further studies are warranted to demonstrate its efficacy in this respect.

31830 (DOE/ER/61150–1, pp. 64) **Improved localization of tumor with streptavidin and labeled biotin as a substitute for antibody.** Hnatowich, D.J. (Univ. of Massachusetts Medical Center, Worcester (United States)); Fritz, B.; Virzi, F.; Mardirossian, G.; Rusckowski, M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Because of the short physical half life of ^{99m}Tc (Tc), the recent popularity of novel methods of radiolabeling anti-tumor antibodies with Tc has necessitated earlier imaging than is the case with ^{111}In (In). If, as is likely, tumor accumulation of antibody at these early times is largely nonspecific, then no evidence suggests that antibodies are the preferred agent for early imaging of solid tumors. Because of the attractive properties of (strept)avidin and biotin for in vivo targeting applications, the authors have investigated the tumor localization of radiolabeled biotin administered subsequent to the administration of unlabeled (strept)avidin. The rate of diffusion in and out of tumor tissue was investigated for in vitro for a specific IgG antibody (C110 anti-CEA antibody), a nonspecific IgG antibody, avidin, streptavidin, succinylated avidin and dihydroxypropyl avidin, all radiolabeled with In via cDTPA. Cubes of fresh tumor (LS174T) 1 mm on edge were incubated at 37C in microtiterplate wells with each protein. The rate of diffusion in was measured by periodically removing cubes for counting. Most proteins showed identical and modest accumulations in the cubes and relatively rapid wash out as well. The exceptions were the specific antibody whose high uptake and high retention were due largely to binding to surface antigens. A similar high uptake was observed for avidin although, in this case, tumor activity decreased with time of wash-out.

31831 (DOE/ER/61150–1, pp. 65) **Pharmacokinetics of an anti-CEA antibody radiolabeled with ^{111}In via DTPA and with ^{99m}Tc via two direct labeling methods: A comparison in patients.** Hnatowich, D.J. (Univ. of Massachusetts Medical Center, Worcester (United States)); Mardirossian, G.; Roy, S.; Wu, C.; Rusckowski, M.; Griffin, T.W.; Brill, A.B. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Although antibodies radiolabeled with technetium-99m (Tc) by several direct methods are receiving increased attention, the properties of this label relative to each other and relative to that of indium-111 (In) has yet to be adequately assessed. The F023C5 anti-CEA F(ab′)$_2$ antibody was radiolabeled with In via cDTPA or directly with Tc by stannous or mercaptoethanol reduction so that the pharmacokinetics of these three labeling methods could be compared. Four patients received 1 mg of the antibody radiolabeled with 15 mCi of Tc one week before receiving an additional 1 mg of the antibody labeled with 1 mCi of In. Six additional patients received only a single administration of the Tc-labeled antibody. Radiochromatograms by size exclusion HPLC of In in serum and urine samples were typical of that observed previously with other In-labeled antibodies: In in serum appeared primarily as labeled F(ab′)$_2$ fragments and in urine as a single peak due to one or more catabolites. The identical analysis of serum and urine samples from patients receiving Tc provided radiochromatograms very different from that obtained with In: for both labeling methods Tc in serum at all times appeared predominantly as labeled Fab fragments with only about 15% present as labeled F(ab′)$_2$. Further analysis by open column Sephadex G50 chromatography and silica gel and reversed phase TLC showed that this low molecular weight peak was not due to pertechnetate but to labeled cysteine, possibly generated by antibody catabolism. The biodistribution of In in patients was typical of that seen previously for other In-labeled F(ab′)$_2$ fragments. At 1 day, 12% ID of In was present in liver, 7% in both kidneys and about 46% was still in circulation. The biodistribution of Tc was independent of the labeling method and was generally as expected for the administration of a labeled Fab fragment.

31832 (DOE/ER/61150–1, pp. 66) **Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated F(ab′)$_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8.** Rosenstraus, M.J. (CYTOGEN Corp., Princeton, NJ (United States)); Gilman, S.C. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

To assess the potential of 15A8-derived fragments for imaging breast cancer metastases, the radiochemical, immunochemical and pharmacokinetic properties of F(ab′)$_2$ generated by pepsin, papain and bromelain digestion were compared. After the F(ab′)$_2$ were reduced to Fab′ and labeled at their sulfhydryl residues with ^{99m}Tc, the radiochemical purities were 95%, 82%, and 95% for the pepsin-, papain- and bromelain-generated fragments, respectively; size exclusion HPLC analysis indicated that the majority of the ^{99m}Tc was associated with protein that eluted as Fab′. When assayed for binding to antigen-positive cells in conditions of antigen excess, two different preparations of pepsin-generated Fab′-^{99m}Tc exhibited immunoreactive fractions of 28% and 52%. Similarly, two different preparations of papain-generated Fab′-^{99m}Tc exhibited immunoreactive fractions of 55% and 60%, and a single preparation of bromelain-generated Fab′-^{99m}Tc exhibited an immunoreactive fraction of 70%. When injected into nude mice bearing xenografts of the human breast cancer cell line MCF-7, both the pepsin- and papain-generated Fab′-^{99m}Tc specifically localized to the tumors.

31833 (DOE/ER/61150–1, pp. 68) **Biological evaluation of selected carbohydrate antibody conjugates.** Qi, P. (Univ. of Alberta, Edmonton (Canada)); Sykes, T.R.; Noujaim, A.A.; Koganty, K.R.; Selvaraj, S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The authors have developed several new methods to attach sialic acid, N-Acetylgalactosamine (GalNAc) and Gal-GalNAc to human IgG (higG), which served as a model antibody for these studies. Novel hexafluoro sidechain derivatives of GalNAc and Gal-GalNAc were prepared and linked with higG. The conjugation ratio was simply determined by integration of calibrated ^{19}F-NMR signals from analysis of the purified conjugate. For sialic acid, a linking derivative containing an aliphatic aldehyde functionality was synthesized and the final conjugate was analyzed using a resorcinol assay. Typical conjugation levels were in the range of 2-8 residues per higG. Biodistribution studies were conducted in conventional ICR mice using radioiodinated analogues of these higG conjugates, and unmodified higG as the control. As expected, enhanced liver uptake was observed at early time periods after injection with an associated change in circulating blood levels for the Galactose-based higG preparations. However, no significant differences in the biodistribution were observed for the sialic acid conjugates.

31834 (DOE/ER/61150–1, pp. 69) **Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc.** Oliva, J.P. (National Inst. of Oncology and Radiobiology, Havana (Cuba)); Cardenas, R.; Rovnij, N.; Martinez, O.; Gonzalez, G.; Choy, J.; Pimentel, G. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Labeling of MoAb with 131-I was done using three methods: Chloramine T, Iodine monochlorure and Iodogen. Labeling of MoAb with 99m-Tc was done using the direct method. The authors prepared and tested the pharmacokinetics of the following labeled MoAb: IOR-T1, T-lymphocytes, lymphoma; IOR-R3, Epidermal Growth Factor, epidermoid, receptor, carcinomas; IOR-CEA, carcinoembryonic antigen, adenocarcinomas. Each patient received 110 MBq of 131-I or 740 MBq of 99m-Tc. The RI was done at 6 and 24 hours after injection of 99m-Tc and at 24, 48 and 72 hours for 131-I. In all cases, planar scintigraphies were performed and images were treated by background subtraction and smoothing. In the clinical part the authors studied 13 patients with Hodgkin's and non-Hodgkin's lymphomas, 16 patients with lung and 10 patients with colorectal tumors. All these patients were studied with 131-I, 99m-Tc-IOR-T1, 131-I, 99m-Tc-IOR-R3 and 131-I, 99m-Tc-IOR-CEA before any treatment.

31835 (DOE/ER/61150–1, pp. 70) **Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T.** Lambert, F. (State Univ. of Ghent (Belgium)); Slegers, G. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Human placental alkaline phosphatase (hPLAP) is a potentially valuable tumor marker for ovarian tumors and seminomas. About 50% of patients with ovarian tumors and the majority of patients with seminomas have increased serum levels of the enzyme. Tumor material of these patients is also positive. Thus early detection of these cancers may be possible with [^{77}Br] labeled anti-hPLAP antibodies. Bromine represents a more suitable radiolabel than iodine due to the stronger carbon-bromine bonds compared to carbon-iodine bonds. The anti-hPLAP MAb is radiobrominated at pH 6.5 using a 250-fold molar excess of chloramine-T in a total reaction volume of 125 μl. The bromination is allowed to proceed for 15 min at 20C. The labeling yield is determined by trichloroacetic acid precipitation of the labeled protein and the immunoreactivity is tested with an enzyme linked immunosorbent assay. Under optimum radiobromination conditions a 34% radiochemical yield of labeled MAb with more than 90% immunoreactivity is obtained.

31836 (DOE/ER/61150–1, pp. 71) **I-131 anti-Ama monoclonal antibody for radioimaging of atheromas.** Cheng, K.T. (Medical Univ. of South Carolina, Charleston (United States)); Chakrabarti, M.; Spicer, K.M.; Kirsch, W.M.; Fowler, S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

This study evaluated the possibility of detecting atheromatous lesions by radioimaging of I-131 anti-Ama (Ama: Aminomalonic acid) monoclonal antibody (MoAb). Ama has been isolated from both human and experimental atherosclerotic plaque. The anti-Ama MoAb (IgG$_{2a}$) was produced using the hybridoma techniques. The MoAb was purified by HPLC and radiolabeled with I-131 using the Iodogen method. The immunoreactivity of the I-131 anti-Ama MoAb was not changed as indicated by the ELISA essay. The I-131 anti-Ama MoAb was stable for at least 7 days when incubated in rabbit serum and analyzed daily by HPLC. The I-131 anti-Ama MoAb was injected into normal NZW rabbits and hypercholesterolemic HL rabbits (N = 3) with induced atheromas in the aortas. Serial images were taken immediately and up to six days after injection. The animals were sacrificed on the sixth day. The images showed that the MoAb was intensely localized in the liver and kidneys. The atheromas could not be identified by the imaging because of the high background. The biodistribution studies on the sixth day confirmed that the blood pool still contained a high concentration of activity.

31837 (DOE/ER/61150–1, pp. 72) **Synthesis, pharmacokinetic and clinical studies of ^{131}I-MIBG prepared in Mexico.** Ferro, G.F. (Inst. Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Lezama, J.C.; Murphy, C.A. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Radiolabeled meta-iodobenzylguanidine (MIBG) has been one of the most successful of recent radiopharmaceuticals. It has been shown to have high diagnostic sensitivity and specificity for many tumors of neuroectodermal origin. In this paper the authors present the synthesis, labelling pharmacokinetic and clinical studies of ^{131}I-MIBG prepared in their laboratory. The pharmacokinetics characteristics of ^{131}I-MIBG were analyzed by the Chan's program using the Wagner-Nelson method. The radiotracer was administered to 15 patients which were imaged after 48 hours. The study was repeated in four of them with a commercial product. Pharmacokinetics studies show that after intravenous injection, clearance of the tracer from the vascular space follows a biexponential kinetics. Up to 6.1% of the administered dose remain in the blood after 45 minutes followed by a monoexponential behavior. 45 to 55% of the dose is recovered in the urine, in the first 24 hours.

31838 (DOE/ER/61150–1, pp. 73) **A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG.** Rusckowski, M. (Univ. of Massachusetts Medical Center, Worcester, MA (United States)); Fritz, B.; Hnatowich, D.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The accumulation of radiolabeled nonspecific polyclonal IgG and HSA in sites of inflammation has been shown to be nonspecific and due to an increase in fluid in the interstitial space. Thus, other proteins, such as streptavidin, might just as likely be successful at localizing therein. However, as a protein, streptavidin would have similar disadvantages to labeled proteins; for example, images obtained with radiolabeled proteins show a high level of radioactivity in liver and, at early time points, high blood pool activity. This also make Tc-99m with its short physical half-life less appealing as a label for these proteins. If imaging is to be performed quickly, then an approach is need with low nonspecific tissue accumulations and rapid blood pool clearance. This is the attractions of the streptavidin-biotin system; nonradiolabeled streptavidin (STAV) is administered to be followed at a later time with a quick clearing In-11-labeled biotin. The authors first compared In-111-labeled-nonspecific polyclonal IgG and In-111-labeled-STAV in mice with an E.Coli infection in the left thigh. Next they examined the preinjection approach with the administration of 60 ug of nonradiolabeled STAV (i.v.) followed at 3 hrs with 1 ug of an In-11-EDTA-biotin (i.p.) with imaging and sacrifice 3 hrs later and a further improvement was seen.

31839 (DOE/ER/61150–1, pp. 74) **Quantitation of thrombogenicity of technetium-99M and indium-111 labeled canine platelets (PLT) in a hemodialyzer (HD).** Dewanjee, M.K. (Univ. of Miami School of Medicine, FL (United States)); Kapadvanjwala, M.; Sanchez, A.; Elson, R.; Ganz, W.I.; Serafini, A.N.; Sfakianakis, G.N. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Platelet thrombosis (PLTTH) on HD was quantified with In-111 and Tc-99m labeled platelets (TCPLT, INPLT); 150 ml of blood were collected in 25 ml of ACD anticoagulant from conditioned Beagle dogs. The platelets were labeled with In-111 tropolone (300 uCi) and Tc-99m HMPAO (600 uCi) and sham-dialysis was performed with hollow-fiber hemodialyzer in a flow-loop at 37C, with flow-rate of 150 ml/min.; after SHD, the HD was washed with saline, cut in 5 segments and HD-radioactivity was measured with an ionization chamber. The mean and std. dev. vales of percent of total INPLT, TCPLT and ionization chamber. The mean and std. dev. values of percent of total INPLT, TCPLT and regional platelet-density (10^9/ m^2) retained on HD as adherent thrombus (ADTH) were tabulated. Highest platelet-density was observed at the exit-port of HD; TC-PLT values were lower than INPLT ($P<0.05$). PLTTH on HD and regional platelet-density could be measured with both INPLT and TCPLT; INPLT values are more accurate than TCPLT values.

31840 (DOE/ER/61150–1, pp. 75) **Quantitation of comparative thrombogenicity of dog, pig and human platelets (PLT) in a hemodialyzer (HD).** Dewanjee, M.K. (Univ. of Miami School of Medicine, FL (United States)); Kapadvanjwala, M.; Ganz, W.I.; Serafini, A.N.; Sfakianakis, G.N. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Comparative platelet thrombogenicity (CPLTTH) was quantified with In-111 labeled platelets (INPLT); 150 ml of blood were collected in 25 ml of ACD anticoagulant from conditioned Beagle dogs, Yorkshire pigs and human volunteer (non-smoker). The platelets were labeled with In-111 tropolone (300 uCi) and sham-dialysis was performed with hollow-fiber hemodialyzer (90 SCE Althin-CD Medical Inc.) in a flow-loop with blood-reservoir maintained at 37C. with flow-rates of 7-, 150- and 270 ml/min.; after sham-hemodialysis, the HD was washed with saline and HD-radioactivity was measured with an ionization chamber. The pharmacological intervention with prostacyclin-analog (Iloprost 100-2000 ng/ml) was carried by addition of Iloprost in the blood reservoir. The mean value and standard deviation of percent of total INPLT radioactivity retained on HD as adherent thrombus (ADTH) at 3 flow-rates were tabulated. The canine and porcine platelets are 5 and 1.5 times more thrombogenic than human platelets. The quantitation of CPLTTH with INPLT may provide an estimation of prosthesis-induced thrombogenicity of human platelets from animal studies. The pharmacological intervention with Iloprost indicated a significant drop of platelet-deposition on the hemodialyzer.

31841 (DOE/ER/61150–1, pp. 76) **Comparative PMN granulocyte retention of In-111 and Tc-99m HMPAO labeled PMN granulocyte of dogs on cellulose acetate hemodialyzers (HD).** Dewanjee, M.K. (Univ. of Miami School of Medicine, FL (United States)); Kapadvanjwala, M.; Ganz, W.I.; Serafini, A.N.; Sfakianakis, G.N.; Elson, R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Leukopenia during hemodialysis and leukocyte overshoot had been recognized in patients undergoing dialysis. With In- and Tc-99m labeled PMNGs, the authors quantified the retention of canine PMNG on HD; 150 ml of blood were collected in 25 ml of ACD anticoagulant from conditioned Beagle dogs. The PMNGs were separated by double-density gradient technique, labeled with In-111 tropolone (300 uCi) and Tc-99m HMPAO (600 uCi) and sham-dialysis was performed with hollow fiber hemodialyzer (90 SCE, Althin-CD Medical Inc.) in a flow-loop at 37C, with flow-rate of 150 ml/min.; after SHD, the HD was washed with saline and HD-radioactivity was measured with an ionization chamber. From the PMNG-bound radioactivity in blood and segments of hemodialyzer, complete blood counts and differential, the regional PMNG-density was calculated. The mean and standard deviation values of percent of Tc-99m and In-111 labeled PMNGs retained on HD and regional PMNG density (10^3Xnumber meter^2) on 5 segments of HD were tabulated. Results of Tc-PMNG retention are slightly lower than In-PMNG ($P < 0.01$). Both Tc-PMNGs and In-PMNGs could be used for PMNG retention on HD and estimation of prosthesis-induced leukopenia.

31842 (DOE/ER/61150–1, pp. 77) **Comparative loss of In-111 labeled PMN granulocyte from dog, pig and man to cellulose acetate hemodialyzer (HD).** Dewanjee, M.K. (Univ. of

Miami School of Medicine, FL (United States)); Ghafouripour, A.K.; Kapadvanjwala, M.; Ganz, W.I.; Serafini, A.N.; Sfakianakis, G.N. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Leukopenia during hemodialysis and leukocyte overshoot had been recognized in patients undergoing dialysis. The loss of PMNG by dialyzer-retention was never quantified. With In-111 labeled PMNG (INPMNG), the authors quantified adhesion and compared the retention of canine, porcine and human PMNG; 150 ml of blood were collected in 25 ml of ACD anticoagulant. The PMNGs were separated by sedimentation with Volex and Ficoll-Hypaque double-density gradient (1.07 and 1.16 gm/ml) and labeled with In-111 tropolone (300 uCi) and sham-dialysis was performed with follow fiber hemodialyzer (90 SCE, Althin-CD Medical Inc.) in a flow-loop at 37C, with flow-rates of 150 ml/min; after SHD, the HD was washed with saline and HD-radioactivity was measured with an ionization chamber. The mean and standard deviation values of percent of total IMPMNG retained on HD and regional human PMNG density (number/meter^2) were tabulated. Unlike platelets, PMNG adhesion of human and dog is similar, the higher value for pig is not statistically significant ($P<0.01$). For 3 species, the pattern of PMNG retention is concave with highest adhesion at exit and entry port of HD. The quantitation of PMNG retention may provide an estimation of prosthesis-induced leukopenia of human patients from animal studies.

31843 (DOE/ER/61150–1, pp. 79) **An animal model for radiopharmaceutical research (Dideiphis albiventis) in HM-PAO-Tc-99m use.** Canellas, C.O. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina)); Dezi, R.; Iodice, O.; Affanni, J.M.; Pomillo, A.B.; Vitale, A.A.; Sampere, J.J.M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Considerable work was devoted to obtaining a synthesizing procedure of molecules with chelating properties for Tc-99m. This is case of HM-PAO-Tc-99m. The presence of eventual impurities in HM-PAO-Tc-99m after the labelling procedure was quantified by means of chromatography systems. Mice were used for assessment of biodistribution. MH-PAO-Tc-99m was administered to the animal model was killed at different time periods: 5.0, 10.0, 15.0, 30.0, 45.0, 60.0 and 90.0 minutes. The assessment of the plasmatic kinetics was performed in order to evaluate what happened after the radiopharmaceutical gets into the general circulation. The authors used two different biological models, Wistar rats and South American opossum Didelphis albiventis. Immediately after the injection, the activity in the blood stream was recorded Data were obtained by means of recorder at a speed of 1.0 cm/min. The values of blood mixture was 0.868 sec. The first component corresponds to the mean speed of brain collection (17.308 sec). The second component corresponds to the mean speed of hepatic collection. Finally, the third component correspond to the mean speed of renal elimination. The use of HM-PAO-Tc-99m on this biological model 'zarigueya,' provides an excellent evaluation method for brain radiopharmaceuticals.

31844 (DOE/ER/61150–1, pp. 80) **Production of no-carrier added Yttrium-86 for radio-immuno-imaging using positron emission tomography (PET).** Zweit, J. (Royal Marsden Hospital, Sutton, Surrey (United Kingdom)); Babich, J.W.; Bakir, M.A.; Ott, R.J.; Sharma, H.L. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

A method for the production and radiochemical purification of no-carrier added ^{86}Y suitable for MoAb labelling has been developed. The ^{86}Y is produced by the proton irradiation of a natural SrO target using the ^{88}Sr(p,3n) reaction. Using an energy window of 46-40 MeV, the thick target yield of ^{86}Y at EOB is 10.6 mCi/uAH and the contamination of ^{87}Y and ^{88}Y is 10.6 and 0.05% respectively. The levels of these contaminants could be significantly reduced by using the ^{86}Sr(p,n)^{86}Y reaction on an enriched ^{86}Sr target. For the radiochemical separations of ^{86}Y, both anion and cation exchange chromatography systems were investigated and compared. In the anion exchange resin AG-1X8 $(CO_3)^{2-}$, the Sr is eluted with 0.001M $(NH^4)CO^3$ while ^{86}Y remains adsorbed on the resin. The ^{86}Y activity is then eluted in a 3ml volume of 1M HCl with a >80% yield. Alternatively, the cation exchange resin Dowex 50W-X8(Na$^+$) was used to adsorb the Sr while ^{86}Y was eluted with >90% yield in a 3 ml volume of 0.003M EDTA. The ^{86}Y activity from either column is then further purified using AG1-X8(Cl) column. The ^{86}Y is collected by eluting with 8M HCl while the trace metal impurities of Fe, Cu, Zn, Co and Ga are all adsorbed. The ^{86}Y produced was shown to complex DTPA, at DTPA concentrations down to 1ug/ml, with an efficiency of 80-90%.

31845 (DOE/ER/61150–1, pp. 81) **Analysis of [F-18]-L-6-fluorodopa and metabolites in plasma for PET studies.** Chan, G.L.Y. (Univ. of British Columbia, Vancouver (Canada)); Pate, B.D.; Hewitt, K.A.; Schofield, C.J.; Adam, M.J.; Ruth, T.J. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In Positron Emission Tomographic (PET) studies of cerebral dopaminergic function in vivo with the tracer [F-18]-L-6-fluorodopa (FD), a batch contact alumina extraction method (AEM) has been used to separate FD from its metabolite, 3-OMe-FD, in plasma to obtain the input function for the kinetic analysis of striatal FD uptake. The AEM is based on selective adsorption of catechols onto alumina. This study compares the EAM with a reversed phase ion-pair high performance liquid chromatographic (HPLC) method. The authors have also evaluated the relationship between the activity ratio (metabolites/FD) and time and in addition, the relationship between age and the subject and the rate of change of the activity ratio (metabolites/FD) with time from data obtained from patients in a movement disorder study. In the comparison of the AEM and HPLC method, arterial blood was collected at 5, 10, 20, 30, 60 and 90 min following an I.V. bolus injection of FD (~107 MBq) into male cynomolgus monkeys (~3 kg weight). The monkeys were given 2 mg/kg of carbidopa I.P. 1 hour prior to FD injection to inhibit peripheral decarboxylation of FD. In the HPLC analysis, 3-OMe-FD was the major metabolite, with F-dopamine sulfate and F-HBA as two minor metabolites. Neither F-dopac nor F-dopamine were detected. The percentage of the radioactivity due to FD from the HPLC analysis at the above sampling times was 71, 56, 52, 42, 28 and 27 respectively, while the AEM gave the values of 71, 63, 53, 41, 34 and 29.

31846 (DOE/ER/61150–1, pp. 82) **Evaluation of metyrapone as a radiotracer for SPECT.** Yu, J.; Mertens, J.; Zolle, I.; Hoefer, R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Metyrapone (X_3), metyrapol (X_{13}) and phenyl-metyrapone (X_4) showed almost identical binding. 4′-bromo-metyrapone (X_8) and metyrapone-mono-N-oxide (X_{14}) are weaker binders. Deoxycorticosterone (DOC, substrate) and corticosterone (product) were included in the assay. DOC (A) is a weak competitor, corticosterone (B) is not effective. Derivatives of phenyl-metyrapone substituted in 2-position (X_9-X_{12}) showed the highest binding affinity, 2-bromo-phenyl-metyrapone was therefore used for labelling with radioiodine. Labelling was performed by using the Cu^{+1}-assisted nucleophilic exchange method (2): 2-bromo-phenyl-metyrapone was reacted with radioiodide in a 10% acetic acid solution (500 μl) in the presence of 5×10^{-7}M $CuSO_4$ at 100C for

40 min. After semi-preparation HPLC the 2-iodo-product is concentrated on a mini RP column and is recovered in ethanol. The radiopharmaceutical is made up for injection by addition of isotonic saline. Quality control is performed by HPLC.

31847 (ECN-I--92-021) **Heat production by photons in the BNCT beam filter components in HB11 at the HFR.** Freudenreich, W.E.; Haas, J.B.M. de. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1992. 16p. Order Number DE93601956. Source: OSTI; NTIS; INIS.

The point-kernel shielding code MARMER has been used to calculate the heat production by photons in the filter components of the BNCT-beam at the HFR. The critical materials of the filter in relation with the heat generation are the sulphur (5 cm) and the liquid argon (150 cm). The calculated heat loads are 60 W for the sulphur filter and 96 W for the liquid argon filter (an area cross-section of 1000 cm^2 is assumed for the filter components). 7 refs.; 1 fig.; 6 tabs.

31848 (ECN-I--92-022) **Development study of a biological thermal neutron facility for the Petten BNCT project at the LFR.** Freudenreich, W.E.; Stecher-Rasmussen, F.; Haas, J.B.M. de. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jun 1992. 29p. Order Number DE93601957. Source: OSTI; NTIS; INIS.

The Low Flux Reactor (LFR) in Petten offers potential opportunities for the development of thermal neutron facilities tailored for the Petten BNCT-project. In a first step an attempt is made to develop a facility for the preclinical biological studies using as probe cell cultures and small animals (mice). Calculations with the Monte-Carlo code MCNP show that the specifications for cell/mice irradiations (dose rate of photons and fast neutrons $\leq$1Gy/h and thermal fluence rate $\geq 10^9 cm^{-2}s^{-1}$) can nearly be reached by replacing a part of the lead shield by bismuth and shielding the remaining parts of lead with boron and adding another 50cm of graphite moderator. The calculated dose rates for this facility are 0.8Gy/h for photons and 0.3Gy/h for fast neutrons at a thermal fluence rate of $0.8 \cdot 10^9$ $cm^{-2}s^{-1}$. The estimated uncertainties are 20% for the dose rates and 10% for the thermal fluence rate. (author). 8 refs.; 6 figs.; 3 tabs.

31849 (LA-UR--92-2039) **Functional MRI studies of human vision on a clinical imager.** George, J.S. (Los Alamos National Lab., NM (United States)); Lewine, J.D.; Aine, C.J.; van Hulsteyn, D.; Wood, C.C.; Sanders, J.; Maclin, E.; Belliveau, J.W.; Caprihan, A. Los Alamos National Lab., NM (United States). [1992]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9210149--1: 14. annual international conference on IEEE Engineering in Medicine and Biology Society, Paris (France), 29 Oct - 1 nov 1992). Order Number DE92017448. Source: OSTI; NTIS; INIS; GPO Dep.

During the past decade, Magnetic Resonance Imaging (MRI) has become the method of choice for imaging the anatomy of the human brain. Recently, Belliveau and colleagues have reported the use of echo planar magnetic resonance imaging (EPI) to image patterns of neural activity. Here, we report functional MR imaging in response to visual stimulation without the use of contrast agents, and without the extensive hardware modifications required for EPI. Regions of activity were observed near the expected locations of V1, V2 and possibly V3 and another active region was observed near the parietal-occipital sulcus on the superior surface of the cerebrum. These locations are consistent with sources observed in neuromagnetic studies of the human visual response.

31850 (LA-UR--92-2698) **A weighted iterative algorithm for neuromagnetic imaging.** Gorodnitsky, I. (Los Alamos National Lab., NM (United States)); George, J.S.; Schlitt, H.A.; Lewis, P.S. Los Alamos National Lab., NM (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921197--1: 14. annual international IEEE in medicine and biology society, Lyon (France), 2-4 Nov 1992). Order Number DE92040244. Source: OSTI; NTIS; GPO Dep.

The goal of neuromagnetic source reconstruction is high resolution 3-D mapping of the current distribution within the brain. However, the neuromagnetic inverse problem is ill-posed and typically underdetermined. The Moore-Penrose pseudoinverse provides a linear algebraic inverse calculation that simultaneously minimizes chisquare and the Euclidean norm of the component currents. Such "minimum norm" reconstructions tend to produce diffuse and superficial current distributions because voxels nearer the sensor array can account for more power in the data with less current than deeper voxels. We describe an algorithm that overcomes the bias of minimum norm procedures toward superficial solutions by using weights chosen to compensate for the distance dependence of magnetic signal strength. We also apply a Bayesian weighting strategy in an iterative pseudoinverse computation, to address the bias of the linear estimator procedure toward diffuse solutions. This strategy produces a progressively more focal current distribution while accomodating distributed current sources, and appears to effectively reduce the problems associated with the under-determined linear system.

31851 (NEI-NO--224) **Contrast-enhanced computed tomography of the primary tumor in muscle invasive carcinoma of the urinary bladder.** Sager, E.M. (Norske Radiumhospital, Oslo (Norway)). Oslo Univ. (Norway). 1991 105p. Order Number DE92644184. Source: OSTI; NTIS; INIS.

Reprints of six previously printed papers are attached.

Patients with muscle invasive carcinoma of the urinary bladder were examined with contrast-enhanced CT of the primary tumor. A specially designed technique was developed to increase the diagnostic potential of CT. The most important points about the technique were controlled filling of the bladder, the use of thin slices, series of scans before and after intravenous injection of contrast medium, and long scanning times in the precontrast series. The absorbed dose to the patient resulting from the new technique was found to be within the range of the dose from urography or barium enema. This dose was considered to be acceptable given the diagnostic gain of the procedure. Features of irradiated bladder tumors were analysed to find which parameter correlated with persistent malignancy. High contrast enhancement of a tumor relative to the bladder wall was found to be the best indicator of a malignant tumour after irradiation. 127 refs.

5507 Microbiology

Refer also to citation(s) 30438, 30449, 30450, 30451, 30734, 30797, 31728, 32008

5508 Morphology

Refer also to citation(s) 31849, 31850

5509 Pathology

Refer also to citation(s) 31769

31852 (INIS-mf--13329, pp. 186-188) **The use of a scanning proton microprobe in AIDS research.** Cholewa, M. (Melbourne Univ., Parkville (Australia). School of Physics); Legge, G.J.F.; Weigold, H.; Holan, G.; Birch, C. Australian Inst. of Nuclear Science and Engineering, Lucas Heights (Australia). 1991. 212p. (CONF-9111178--: 7. Australian conference on nuclear techniques of analysis, Melbourne (Australia), 20-22 Nov 1991). In *7th Australian conference on nuclear techniques of analysis: proceedings.* Order Number DE92001401. Source: OSTI; NTIS (US Sales Only); INIS.

It is demonstrate that total quantitative scanning analysis enables the scanning proton microprobe to scan a specimen and simultaneously extract all the information required to produce maps of the distribution for each element and the elemental spectra from all regions of interest. In this study the uptake of inorganic polyanion drugs was investigated and their activity for the HIV virus in a continous T-lymphocite line and in peripheral blood lymphocites tested. Further, the uptake spectrum was measured with sufficient quantitative accuracy to determine the structure of the compound in the cellular environment. Although quantitative measurements can be made with such data, it was emphasized that in all cases the drug concentration used in the incubation treatment was subtoxic for the particular component. Extensive study of damage done to the cell by intense proton beams during elemental analysis was also performed with scanning transmission ion microscopy and it was found to be of no great concern. 2 figs.

5510 Physiological Systems

31853 (IPEN-PUB–361) **Production of biological reagents for radioimmunoassay second antibody.** Borghi, V.C.; Silva, S.R. da; Bellini, M.H.; Lin, L.H. Instituto de Pesquisas Energeticas e Nucleares (IPEN), Sao Paulo, SP (Brazil). Feb 1992. 23p. (In Portuguese). (CONF-9008247–: 2. Latin American congress of biotechnology, Havana (Cuba), 7-11 Aug 1990). Order Number DE92640589. Source: OSTI; NTIS (US Sales Only); INIS.

The experimental production of second antibody to be used in hormonal assays, in which the first antibody is raised in rabbits, is described. Four sheep were immunized with the rabbit immunoglobulin prepared at IPEN-CNEN laboratory. Their antisera were evaluated by the human thyrotropin radioimmunoassay employing materials provided by the National Hormone and Pituitary Program (USA), in comparison with a reference antiserum of known quality, produced in goat by the Radioassay Systems Laboratories - RSL (USA). From the fourth booster injection the animals developed antiserum with titer similar to that exhibited by the commercial product, even presenting higher values. These antisera are now being examinated for the optimal conditions of precipitation before be packed for future use and distribution. (author).

5530 Agriculture and Food Technology

Refer also to citation(s) 30797

31854 (CNIC–00445) **Autoradiographic visualization on the role of central ^{3}H-5-hydroxytryptamine in acupuncture analgesia.** Zhu Shoupeng (Suzhou Medical Coll., JS (China)); Shi Fuxi; Liu Zhonghao; Jiang Ji. China Nuclear Information Centre, Beijing, BJ (China). Oct 1990. 12p. (In Chinese, English). (SMC–0048.). Order Number DE93601718. Source: OSTI; NTIS (US Sales Only); INIS.

The role played by central 5-hydroxytryptamine (5-HT) in electroacupuncture analgesia has been studied in rats by means of autoradiography with isotopic tracers ^{3}H-5-HT. The purpose of the study is to determine the localization of ^{3}H-5-HT in the midbrain raphe nuclei and in the mesencephalon aquaeduct as well as periaquaeductal gray matter. Parallel experiments were studied by freezing microautoradiographic method and histo-fixative microautoradiographic method. The analgesic effect of acupuncture can be enhanced or lowered by the increment or the decrement of the 5-HT level in the midbrain raphe nuclei and in the mesencephalon aquaeduct as well as periaquaeductal gray matter. The results show that when the rats were subjected to electro-acupuncture analgesia, the microautoradiographic intensities of ^{3}H-5-HT both in the midbrain raphe nuclei and in the areas of mesencephalon aqueduct were significantly increased. It may be observed that the release of 5-HT in these regions of the brain is accelerated during acupuncture analgesia. From this it can be concluded that the midbrain raphe nuclei and the mesencephalon aquaeduct as well as the periaquaeductal gray matter are closely related to acupuncture analgesia. The results imply that 5-HT in these areas may be one of the most important neurochemical agents mediating acupuncture analgesia.

31855 (CNIC–00456) **Study on the early and late mutants of radiation induced rice.** Yang Hefeng (Lixiahe District Research Inst. of Agricultural Science, Yangzhou, JS (China)); Chen Xiulan; He Zhentian; Gu Shiliang; Xu Chenwu. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 12p. (In Chinese). (CSNAS–0040.). Order Number DE93601651. Source: OSTI; NTIS (US Sales Only); INIS.

After three years of consecutive experiments for the irradiated M_2 generations of 53 different varieties of rice, the following results have been obtained: (1) The average of early mutant plant rate is 1.4%. The rate in the early-maturing varieties is lower than that in the late-maturing varieties. It is in proportion to the length of growing period of these varieties tested. The shortened days of growing period of early mutants are 3 to 32 days (the average was 9.5 days), and it is increasing as the growing period increases. (2) In the irradiated M_2 generation of same variety, the early mutants and late mutants could be simultaneously happened, but the rate of the late mutants is 2.67%, which is higher than the rate of early mutants (1.39%). The shortened and prolonged days of growing period are 11.5 and 10.5 days respectively. These early and late mutants have some changes, both good and bad, in agronomical traits such as plant height, weight per kilo-grains and grains number per tassel. In some extent these changes are significant.

31856 (CNIC–00459) **Development of radiation preservation technique in Beijing.** Zhang Hongdi (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Li Guixiang; Pang Mei. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 8p. (IAE–0089.). Order Number DE93601696. Source: OSTI; NTIS (US Sales Only); INIS.

The ^{60}Co radiation preservation technique which was used to preserve persimmons, green peppers and four varieties of apple was studied. Apples and persimmons were irradiated with 0.1 ≈ 0.7kGy and 0.1 ≈ 1.0kGy respectively, then they were stored under a constant environmental temperature. Green peppers were treated with heat, irradiated with low dose and stored at low temperature. After a certain time of storing, the results showed that the quality of irradiated groups was better than control group, and there was no difference of main nutrient components between the irradiated groups and the control group. Finally, the radiation processing does not cause radioactivity increasing and microelements decreasing in the food.

31857 (CNIC–00467) **Macro-and micro-autoradiographic study in comparison with the incorporation of ^{35}S-methionine by various tissue protein in organism.** Zhu Shoupeng (Suzhou Medical Coll., JS (China)); Mei Shengping; Le Shangcheng. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 9p. (In Chinese). (SMC–0054.). Order Number DE93601719. Source: OSTI; NTIS (US Sales Only); INIS.

The purpose of the study was to observe the incorporation level of ^{35}S-methionine by various tissue protein in organism. By the use of the macro-and micro-autoradiographic technique, the incorporation of ^{35}S-methionine by the tissues has been utilized as an index of various tissue protein synthesis. On this basis, the further experiments showed that tracer agent ^{35}S-methionine was dominantly incorporated in the immature cells of bone marrow and the tissue of liver, kidney and spleen. Its incorporation increased gradually with time. From the experimental results it can be concluded that a strong protein biosynthesis metabolism was produced in these tissues. While the tissues have important physiological function in organism, such as heart, lung and skeletal muscle, but the protein biosynthesis in those tissues was at a low level.

31858 (CNIC–00518) **Radioimmunoassay for platelet activation specific protein GMP-140 on the platelet surface and in plasma.** Wu Guoxin (Suzhou Medical Coll., JS (China)); Li Jianyong; Ruan Changgeng. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 6p. (In Chinese). (SMC–0063.). Order Number DE93601720. Source: OSTI; NTIS (US Sales Only); INIS.

Using monoclonal antibody (McAb) SZ-51 which is specific for an alpha-granule membrane protein (GMP-140) on the surface of human activated platelets, the platelet GMP-140 expression in fixed whole blood was measured by direct radioimmunoassay and GMP-140 microparticles in plasma was measured by sandwich method. The GMP-140 molecules per platelet or milliliter (mL) were calculated for the following subjects; acute myocardial infarction; cerebro thrombosis; diabetic mellitus; asthma attack; epidemic hemorrhagic fever etc.. By comparing with the concentration of thromboxane B_2 (TXB_2) and von Willebrand factor (vWF) in plasma, it is confirmed that the measurement of GMP-140 molecules is better than that of TXB_2 and vWF. It is a sensitive and specific method for evaluating the platelet activation degree in vivo. The establishment of this method will be useful to diagnosing the thrombotic disorders and studying the pathogenesis of some other diseases.

31859 (CNIC–00520) **The research progress on plant mutant germplasm resources in China.** He Cexi (Chinese Academy of Agricultural Sciences, Beijing, BJ (China). Inst. for Application of

Atomic Energy); Ji Linzhen; Zhao Shirong. China Nuclear Information Centre, Beijing, BJ (China). Jul 1991. 8p. (In Chinese). (CSNAS–0047.). Order Number DE93601652. Source: OSTI; NTIS (US Sales Only); INIS.

Mutants induced by nuclear radiation or other mutagens are new artificial germplasm resources. Some mutants have been applied in plant breeding and great achievements have been reached. The status and progress on the collection, identification and utilization of mutants in China are introduced. A proposal for developing mutant germplasm resources with good agronomic characters is suggested.

31860 (IAEA-TECDOC–657) **Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990.** Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria). Jul 1992. 196p. (CONF-9010505–: Final research co-ordination meeting on regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques, Heredia (Costa Rica), 22-26 Oct 1990). Order Number DE92642251. Source: OSTI; NTIS (US Sales Only); INIS.

After an introduction describing the co-ordinated research program the proceedings contain the contributions presented at the final Research Co-ordination Meeting. The papers are in four sections: general aspects of immunoassays in animal disease diagnosis; viral and chlamydial diseases; bacterial diseases; and parasitic diseases. The individual contributions have been indexed separately for inclusion in INIS. Refs, figs and tabs.

31861 (IAEA-TECDOC–657, pp. 77-84) **Detection of cells infected by Thailand strains of pseudorabies virus using a specific DNA probe.** Wongwatcharadumrong, R. (Chulalongkorn Univ., Bangkok (Thailand). Dept. of Pathology); Boonsang, V.; Linne, T. Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria). Jul 1992. (CONF-9010505–: Final research co-ordination meeting on regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques, Heredia (Costa Rica), 22-26 Oct 1990). In *Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990.* 196p. Order Number DE92642251. Source: OSTI; NTIS (US Sales Only); INIS.

The Thailand strains of pseudorabies virus (PRV) have been shown to belong to the type IV group based on the Bam HI restriction enzyme pattern of PRV DNA. This pattern was only found in isolates originating from Thailand. A DNA probe (pTM16) cloned from the Phylaxia strain of PRV hybridized to both the Thailand PRV isolates CB-1 and NB-1 and defines also the difference in the Bam H1 restriction enzyme pattern. This DNA probe can thus not only be used in the diagnosis of PRV in Thailand but also in combination with Bam HI cleavage to discriminate between the European and Thailand strains of PRV. A similar sensitivity of detection was found both in the European and Thailand strains of PRV. (author). 14 refs, 3 figs.

31862 (IAEA-TECDOC–657, pp. 85-91) **The use of ELISA and nucleic acid hybridization tests in research and diagnosis of bovine leukosis virus.** Noda Gomez, J. (Centro Nacional de Sanidad Agropecuaria, San Jose de Las Lajas, La Habana (Cuba)); Perez, M.; Marreras, M.; Abeledo, M.A. Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria). Jul 1992. (CONF-9010505–: Final research co-ordination meeting on regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques, Heredia (Costa Rica), 22-26 Oct 1990). In *Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990.* 196p. Order Number DE92642251. Source: OSTI; NTIS (US Sales Only); INIS.

Enzootic bovine leukosis (EBL) is a disease that affects adult cattle although animals can carry the virus without showing any clinical symptoms. An initial survey in Cuba using the agar gel immunodiffusion test (AGID) revealed that only 15% of the animals on the island were infected and it was therefore decided to undertake a control and eradication campaign. However, prior to the onset of this campaign it was felt necessary to examine a variety of more modern diagnostic procedures to determine which might be most applicable. For the detection of antibodies an ELISA system based on the use of SUMA (a micro-analytical system developed in Cuba) was compared with the AGID and syncytia inhibition test and found to be more sensitive than AGID and far more suitable for large-scale use than either of the other two. For detection of viral proteins the ELISA was compared with a reverse transcriptase assay and the use of immunoperoxidase staining. The latter two methods detected viral proteins in over 50% more samples than the ELISA and although the ELISA is more simple than either of the other to assays when used routinely, its low sensitivity would preclude its use in an eradication programme. (author). 10 refs, 4 tabs.

31863 (IAEA-TECDOC–657, pp. 99-114) **Serological studies on bovine leukemia virus (BLV) infection in Costa Rica by ELISA, immunodiffusion and Western blot tests.** Moreno, E. (Costa Rica Univ., San Jose (Costa Rica). Centro de Investigacion en Biologia Celular y Molecular (CIBCM)); Dolz, G.; Bonilla, J. Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria). Jul 1992. (CONF-9010505–: Final research co-ordination meeting on regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques, Heredia (Costa Rica), 22-26 Oct 1990). In *Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990.* 196p. Order Number DE92642251. Source: OSTI; NTIS (US Sales Only); INIS.

The distribution of bovine leukemia virus (BLV) infection in Costa Rica is presented. BLV is spread throughout the country affecting mostly dairy cattle (Bos taurus) bred in the highlands. BLV isolated from lymphosarcomatous tumors, was similar or identical to those virus strains isolated from herds in the USA. An ELISA with relatively high sensitivity and specificity was developed and a Western blot test was used as confirmatory test. ELISA was very useful for analyzing the immunoglobulin isotype involved in the recognition of viral antigens and for screening of a large number of samples. The Western blot test was important for detecting the antibody response against the individual BLV proteins. Differential recognition of BLV proteins was observed among the different infected animals. Comparative studies showed that the ELISA and Western blot tests developed in our laboratory have a better performance for the diagnosis of BLV infections than some of the commercial available diagnostic kits. A dot blot test using a BLV-cDNA probe for the detection of provirus in bovine cells was also developed. (author). 26 refs, 9 figs, 1 tab.

31864 (INIS-BR–2924) **Proceedings of the 4. Brazilian Meeting on biological control of plant diseases.** Empresa Brasileira de Pesquisa Agropecuaria, Campinas, SP (Brazil). Centro Nacional de Pesquisa de Defesa da Agricultura. 1991 3p. (In Portuguese). (CONF-9110405–: 4. Brazilian meeting on biological control of plant diseases, Campinas (Brazil), 8 Oct 1991). Order Number DE93000804. Source: OSTI; NTIS (US Sales Only); INIS.

This volume contains the proceedings of the fourth Brazilian Meeting on biological control of plant diseases. Selected presentations were abstracted and indexed for the databases.

31865 (INIS-mf–13354) **Animal production and health newsletter. No 16.** Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria). Jul 1992 20p. Order Number DE93601708. Source: OSTI; NTIS (US Sales Only); INIS.

Hard copies are available from Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture.

This Newsletter contains reports on the meetings and training courses held between January and April 1992, including a detailed summary of the final FAO/IAEA Research Coordination Meeting on

"Development of Feeding Strategies for Improving Ruminant Productivity in Areas of Fluctuating Nutrient Supply through the Use of Nuclear and Related Techniques", held in Vienna from 30 March to 3 April. Status reports are presented for the existing nine coordinated research programs, and developments at the Animal Production Unit, Seibersdorf are described.

31866 (INIS-mf–13355) **Soils newsletter. V. 15, no. 1.** Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria). Jul 1992 23p. Order Number DE93601653. Source: OSTI; NTIS (US Sales Only); INIS.

Hard copies are available from Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture.

The First Soils Newsletter of 1992 summarizes the status of the six coordinated research programs (CRPs) currently in progress and announces a new CRP on "The Use of Nuclear and Related Techniques in the Evaluation of the Agronomic Effectiveness of Phosphate Fertilizers, in Particular Rock Phosphates". The first Research Coordination Meeting on "The Use of Nuclear and Related Techniques in Assessment of Irrigation Schedules of Field Crops to Increase Effective Use of Water in Irrigation Projects", was held in Vienna in February 1992, and excerpts from the presented reports are also included in the Newsletter. In addition, there are brief summaries of the Technical Cooperation Projects in the Middle East and Europe region.

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

Refer also to citation(s) 30608, 30609, 30610, 30611, 30612, 30613, 30616, 30618, 30619, 30620, 30621, 30622, 30623, 30625, 30626, 30627, 30628, 30630, 30711, 30761, 30966, 31588, 31589, 31594, 31597, 31653, 31726, 31773, 31779, 31781, 31782, 31787, 31788, 31795, 31803, 31805, 31806, 31807, 31809, 31814, 31818, 31822, 31823, 31824, 31828, 31841, 31842, 32320, 32495, 32535, 32536, 32537, 32542, 32544

31867 (CNIC–00454) **Environmental and agricultural impacts of the Chernobyl NPP accident on the countries of the northern hemisphere.** Yang Xuexian (Chinese Academy of Agricultural Sciences, Beijing, BJ (China). Inst. for Application of Atomic Energy). China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 13p. (In Chinese). (CSNAS–0039.). Order Number DE93601637. Source: OSTI; NTIS (US Sales Only); INIS.

The accident at the Chernobyl Nuclear Power Plant (NPP) on April 26, 1986 resulted in large quantities of radioactive materials being released into the atmosphere. The environmental contaminations and agricultural impacts of the accident on the countries of the northern hemisphere were reviewed. Radiological consequences of the accident were briefly assessed. The data were presented on the results of radioactivity monitoring for air, ground and water, average individual effective dose commitment for each county, and levels of contamination on plant cover, milk, meat in live animals, food, aquatic, and other agricultural products etc. The transfer coefficients of radionuclides in grass-(cow)-milk were listed. Finally, problems on radioecology were discussed.

31868 (CNIC–00458) **Effect of ^{60}Co radiation on the fibrinolysis and anticoagulation of endothelial cells.** Zhou Quansheng (Suzhou Medical Coll., JS (China)); Zhao Yimin; Cheng Mangeng; Li Peixia; Bai Xia; Ruan Changgeng. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 10p. (In Chinese). (SMC–0051.). Order Number DE93601565. Source: OSTI; NTIS (US Sales Only); INIS.

Human umbilical vein endothelial cells were irradiated in vitro with ^{60}Co γ-rays at doses from 0 to 50 Gy. At early stage after irradiation, the amounts of t-PA antigen and activity in the supernatants of endothelial cells culture medium increased rapidly. while PAI activity decreased. Six days after irradiation the t-PA antigen and activity reduced with increasing of radiation dose, whereas PAI activity went up. In addition, the amounts of thrombomodulin, PGI$_2$ and vWF released by endothelial cells also increased at early stage after irradiation. Six days after irradiation, the capacity of synthesis of thrombomodulin and PGI$_2$ within endothelial cells reduced, but vWF went up. In results, after irradiation of endothelial cells with ^{60}Co γ-rays, the fibrinolysis and anticoagulation of endothelial cells increased at early stage, and decreased in the latter period, whereas coagulant activity went up. The relationship between these changes of endothelial function and pathological mechainisms of diseases caused by irradiation are discussed.

31869 (CNIC–00461) **Study on the dose models of ^{147}Pm in tissues of mouse.** Tao Feng (Suzhou Medical Coll., JS (China)); Zhu Shoupeng. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 8p. (In Chinese). (SMC–0052.). Order Number DE93601638. Source: OSTI; NTIS (US Sales Only); INIS.

The metabolic formulae and dose models in organs of mouse in which ^{147}Pm most likely tend to deposit were reported. In terms of these dose models, the dose rate and accumulated dose in mouse organs were calculated after intravenously administration of 1.85×10^4 Bq/g ^{147}Pm(NO$_3$)$_3$ solution.

31870 (CNIC–00462) **Placental and milk transfer as well as distribution of ^{147}Pm in mouse.** Tao Feng (Suzhou Medical Coll., JS (China)); Zhu Shoupeng. China Nuclear Information Centre, Beijing, BJ (China). Dec 1991. 10p. (In Chinese). (SMC–0053.). Order Number DE93601639. Source: OSTI; NTIS (US Sales Only); INIS.

To investigate the metabolism of ^{147}Pm as affected by pregnancy and lactation, mice of nulliparous, pregnant (at 17 days of gestation) or lactating (1 day postpartum) were injected intravenously with 1.85×10^4 Bq/g weight of ^{147}Pm. The females and subsequent litters were killed at various times after injection to determine ^{147}Pm distribution and retention. The experimental results shows that there were differences between the three groups. The half-time of ^{147}Pm in livers of pregnant or lactating mice was noticably longer than that of nulliparous mice, although the initial uptake was approximately 60% of the injected activity in all the three groups. The retention proportion of injected ^{147}Pm activity in femurs of pregnant or lactating mice was also obviously greater than that of nulliparous mice ($p < 0.05$) at 1, 14, and 21 days after injection. The radioactivity of ^{147}Pm in progeny of lactating mice was 20 times as much as that of pregnant mice at 1 or 4 days after injection. The radioactivity of ^{147}Pm in placenta and fetal membrane of late pregnant mice was also significantly greater than that in fetus.

31871 (CNIC–00469) **Effects of ^{60}Co γ-ray irradiation on human platelets.** Wu Guoxin (Suzhou Medical Coll., JS (China)); Zhao Yiming; Ruan Changgeng. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 6p. (In Chinese). (SMC–0055.). Order Number DE93601566. Source: OSTI; NTIS (US Sales Only); INIS.

Human platelet-rich plasma was irradiated with various doses (0,1.25,2.5,5.0,10,20,40Gy) of ^{60}Co γ-ray so as to observing the changes of metabolites and releasing substances of platelets. Alpha-granule membrane protein (GMP-140) molecules on the surface of platelet was expressed significantly increasing when the dosage of ^{60}Co γ-ray was 5 Gy; however, the glycoprotein (GP) I$_b$ and III$_a$ was not changed significantly; thromboxane B$_2$ production in plasma was significantly elevated while the γ-ray was only 2.5 Gy; the concentration of von Willebrand factor was increased when the γ-ray was over 5 Gy, this is in accordance with the GMP-140 molecules. These results indicate that platelets could be activated in vitro when the dosage of ^{60}Co γ was over 5 Gy.

31872 (CNIC–00474) **Effects of irradiation on normal human lymphocytes.** Liu Keliang (Suzhou Medical Coll., JS (China)); Su Liaoyuan; Geng Yongzhi; Xu Yingdong; Liu Fenju. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 12p. (In Chinese). (SMC–0056.). Order Number DE93601567. Source: OSTI; NTIS (US Sales Only); INIS.

After the normal human blood was exposed to ^{60}Co gamma-rays, neutrons and X-ray with different doses, the human lymphocytes induced by PHA, ConA, LPS and PWM were cultured in vitro. The proliferation and differentiation kinetics of human lymphocytes were studied by using ^{3}H-TdR, ^{14}C-UR and ^{14}C-valine incorporation technique. The irradiation inhibition on syntheses of DNA, RNA and protein was observed. The results from the experiments showed: (1) The proliferation and differentiation of human lymphocytes, different lymphocytes subgroups, induced by various mitogens were different. (2) The injury effects of irradiation on synthese of DNA and protein in the lymphocytes stimulated with ConA and PHA were greater than that in the lymphocytes induced by LPS and PWM. (3) The injury effect of lymphocytes irradiated by neutrons was greater than that lymphocytes irradiated by gamma-rays and X-rays. (4) In the irradiated human lymphocytes subgroups induced by various mitogens, the more ability of repairing broken DNA strand subgroup had, the more strong resistance to irradiation it was.

31873 (CNIC–00483) **The effects of ^{60}Co γ-ray irradiation on the cytoskeleton of mouse peritoneal macrophages and human peripheral blood monocytes in vitro.** Chen Xiaomei (Suzhou Medical Coll., JS (China)); Guo Yuhua; Yin Zhiwei; Mao Zijun. China Nuclear Information Centre, Beijing, BJ (China). Mar 1990. 15p. (In Chinese). (SMC–0057.). Order Number DE93601568. Source: OSTI; NTIS (US Sales Only); INIS.

The whole mount cell electron microscopy in combination with selective extraction method for preparing cytoskeletal framework was applied. Cy toskeleton prepared by Triton X-100 treatment of mouse peritoneal macrophages and human peripheral blood monocytes appeared in electron microscopy as a highly organized and interconnected three-dimensional matrix of different fibrous elements. Since such cytoskeletons are open membrane-free system, individual fibrous organizations can be identified by specific antibodies. An indirect immunogold procedure using monoclonal anti-tubulin or anti-actin antibodies was applied to visualize tubulin- or actin-containing structures. The three-dimensional visualization of Triton X-100 resistant cytoskeletons had been used to demonstrate that different doses of ^{60}Co γ-ray caused a distinctive and reproducible alterations of the cytoskeletons of intact mouse peritoneal macrophages and human peripheral blood monocytes in vitro. The results showed that there were some similar alterations with those caused by cytochalasin B and by colchicine. From these observations and other workers' studies, it's likely that ^{60}Co γ-ray irradiation may inhibit cytoplasmic microtubule and microfilament assembling.

31874 (CNIC–00485) **Modulate function and effect of ^{60}Co γ-rays on ConA-induced CD_4^+ and CD_8^+ subpopulations of lymphocytes.** Xu Yujie (Suzhou Medical Coll., JS (China)); Su Liaoyuan; Liu Keliang. China Nuclear Information Centre, Beijing, BJ (China). Mar 1991. 11p. (In Chinese). (SMC–0058.). Order Number DE93601569. Source: OSTI; NTIS (US Sales Only); INIS.

The monocyte-depleted peripheral blood mononuclear cells were separated into B, CD_4^+ and CD_8^+ subpopulations by a Panning technique with McAb CD_4 and CD_8. The purity of the B, CD_4^+ and CD_8^+ subpopulations was 82.7%, 90.4% and 90.8% respectively, which was estimated by an indirect immunofluorescence technique. More than 92% of the three subpopulations were viable according to the trypan blue exclusion test. The radiosensitivities of ConA-induced CD_4^+ and CD_8^+ cells were assessed by ^{3}H-TdR incorporation. Experiment demonstrated that a part of ConA-induced CD_4^+ and CD_8^+ cells was radiosensitive but the rest of them was radioresistant. There was no significant difference between the sensitive part both in the ConA-induced CD_4^+ and CD_8^+ cells while there was great significant difference between the resistant one in the both cell lines. The modulate functions of ConA-induced CD_4^+ and CD_8^+ cells and the effect of 10 Gy ^{60}Co γ-rays on them were investigated by the technique of ^{3}H-TdR incorporation. It was demonstrated that the transformation of LPS-induced B lymphocytes was suppressed by the ConA-induced CD_4^+ and CD_8^+ cells. After irradiation, the suppressor activity of ConA-induced CD_4^+ and CD_8^+ cells didn't decrease. The suppressor activity of ConA-induced CD_8^+ cells were enhanced by the ConA-induced CD_4^+ cells significantly, and the suppressor activity of ConA-induced CD_4^+ cells was also enhanced by the ConA-induced CD_8^+ cells. After irradiation, the enhancement effects of the ConA-induced CD_4^+ and CD_8^+ cells disappeared.

31875 (CNIC–00490) **Study on the ^{90}Sr absorption by agricultural plants grown in soil from Daya Bay and Qinshan area.** Zhao Wenhu (Chinese Academy of Agricultural Sciences, Beijing, BJ (China). Inst. for Application of Atomic Energy); Hou Lanxin; Xu Shiming. China Nuclear Information Centre, Beijing, BJ (China). Mar 1991. 14p. (In Chinese). (CSNAS–0043.). Order Number DE93601640. Source: OSTI; NTIS (US Sales Only); INIS.

The soil around the Qinshan and Daya Bay nuclear power plants were used in this study. The ^{90}Sr was spread into the soil by irrigation. The amount of ^{90}Sr spread were 0.037, 0.37, 3.7 and 370 Bq per gram soil respectively. After being treated, the soil were employed to grow rice, wheat, rape, bean, asparagus lettuce, tomato and peas. The harvested plants were divided into seeds, stems and leaves, husks and roots to measure their radioactivity separately. The results showed that the amount of ^{90}Sr absorbed by the plants was directly proportional to the ^{90}Sr content in the soil. The absorbed ^{90}Sr was mainly distributed in the stems and leaves. The seeds absorbed the least amount of ^{90}Sr compared with the other portions. The old leaves absorbed greater ^{90}Sr than the buds. The accumulated ^{90}Sr per unit dry weight of all plants grown in the soil from Daya Bay area was greater than in the soil from Qinshan area. More than 80% of total ^{90}Sr was distributed in the top layer from 0 to 4 cm. The concentration factors of various plants were also given.

31876 (CNIC–00497) **Study on the retention of enriched UO_2F_2 in the mouse and its radiogenotoxicological effects.** Hu Qiyue (Suzhou Medical Coll., JS (China)); Zhu Shoupeng. China Nuclear Information Centre, Beijing, BJ (China). Jun 1991. 18p. (In Chinese). (SMC–0059.). Order Number DE93601641. Source: OSTI; NTIS (US Sales Only); INIS.

The study on toxicological effects of enriched UO_2F_2 was undertaken in purebred BALB/c male mice to examine: (a) the retention in body; (b) the testicular clearance; (c) the effect of sperm abnormality; (d) the effect of chromosomal aberrations in spermatogonia and primary spermatocytes; and (e) the effect of DNA damage in germ cells in various spermiogenic stages. Results show that enriched UO_2F_2 mainly deposited in the kidneys, then the skeleton and liver. The amount of enriched UO_2F_2 depositing in other tissues was small. Enriched UO_2F_2 was similar to the natural uranium in transference and retention in the body. The testis had efficient clearance of enriched UO_2F_2. Enriched UO_2F_2 could result in sperm abnormality. Even with the same treating does but at different treating time the rates of sperm abnormality were different. Enriched UO_2F_2 could result in chromosomal aberrations in spermatogonia and primary spermatocytes. The important type of aberrations in spermatogonia was break. For primary spermatocytes the most significant aberration was multivalents. Enriched UO_2F_2 could also result in DNA breakage in germ cells. The sensitivity of mouse germ cells at various stages to enriched UO_2F_2 was different. There was a linear relationship between the amount of sperm DNA eluted and enriched UO_2F_2 dose.

31877 (CNIC–00499) **Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments.** Zhu Shoupeng (Suzhou Medical Coll., JS (China)); Wang Liuyi; Cao Genfa; Sun Baofu. China Nuclear Information Centre, Beijing, BJ (China). May 1991. 8p. (In Chinese). (SMC–0060.). Order Number DE93601642. Source: OSTI; NTIS (US Sales Only); INIS.

The purpose of the present study was to ascertain the correlation between the different ionic radius of rare earths nuclides such as ^{170}Tm, ^{152}Eu, ^{147}Pm and its accumulation peculiarity as well as induction of mutagenic effect on bone marrow cells. The study showed that the accumulation peculiarity of rare earths nuclides will vary with the ionic radius. The results indicated that large ionic radius of ^{147}Pm was selectively localized in liver in early stage, while small ionic radius of ^{170}Tm and ^{152}Eu were deposited in bone predominantly. There was a positive relationship between the incidence of chromosome aberration rates and the absorption dose in skeleton by ^{170}Tm, ^{152}Eu, or ^{147}Pm. Studies indicated that the chromosome aberration rates were elevated when the absorption dose in skeleton was increased. Among the type of chromosome aberrations induced by rare earths nuclides with different ionic radius, chromatid breakage was predominant, accompanied with a few chromosome breakage and translocation. At the same time mitosis index of metaphase cells was depressed. Internal contamination of ^{170}Tm, ^{152}Eu, or ^{147}Pm can be induced by some aberrations in one cell. This phenomenon might be due in part to nonuniform irradiation of bone marrow cell with local deposition of these rare earths nuclides with different ionic radius.

31878 (CONF-910529–, pp. 1-7) **Risk assessment from heterogeneous energy deposition in tissue, the problem of effects from low doses of ionizing radiation.** Feinendegen, L.E. (Research Center Juelich GmbH (Germany)); Booz, J. Oak Ridge Associated Universities, Inc., TN (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Low doses of ionizing radiation from external or internal sources cause heterogeneous distribution of energy deposition events in the exposed biological system. With the cell being the individual element of the tissue system, the fraction of cells hit, the dose received by the hit, and the biological response of the cell to the dose received eventually determine the effect in tissue. The hit cell may experience detriment, such as change in its DNA leading to a malignant transformation, or it may derive benefit in terms of an adaptive response such as a temporary improvement of DNA repair or temporary prevention of effects from intracellular radicals through enhanced radical detoxification. These responses are protective also to toxic substances that are generated during normal metabolism. Within a multicellular system the probability of detriment must be weighed against the probability of benefit through adaptive responses with protection against various toxic agents including those produced by normal metabolism. Because irradiation can principally induce both, detriment and adaptive responses, one type of affected cells may not be simply summed up at the expense of cells with other types of effects, in assessing risk to tissue. An inventory of various types of effects in the blood-forming system of mammals, even with large ranges of uncertainty, uncovers the possibility of benefit to the system from exposure to low doses of low-LET radiation. This experimental approach may complement epidemiological data on individuals exposed to low doses of ionizing radiation and may lead to a more rational appraisal of risk.

31879 (CONF-910529–, pp. 28-40) **Health and dosimetry considerations in the ICRP 1990 formulation of effective dose.** Eckerman, K.F. (Oak Ridge National Lab., TN (United States)). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-84OR21400. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The new recommendations of the International Commission on Radiological Protection contained in Publication 60 supersede those of Publication 26 issued in 1977. The recommendations are intended to assist national authorities in formulation of radiation protection guidance. Sufficient explanatory information is included to clearly note that radiation protection issues cannot be resolved on the basis of scientific considerations alone, but also require value judgments regarding the relative importance of different kinds of risks and the balance between risk and benefit. Ionizing radiation causes both deterministic and stochastic effects in irradiated tissue. It is the aim of radiation protection to avoid deterministic effects by setting dose limits below their thresholds and to control exposure to limit the frequency of stochastic effects, believed to occur (albeit with low frequency) even at the lowest doses. Cancer induction and hereditary effects are the stochastic effects of concern. The Commission has relied largely on studies of the Japanese A-bomb survivors in estimating the probability of a fatal cancer and concluded that the most probable dose-response relationship is linear-quadratic. The linear coefficient at low dose or low dose-rate is obtained from the high dose, high dose-rate estimates of risk by dividing by an effectiveness factor of two. Using the data from the A-bomb survivors, the Commission estimated the distribution the fatal cancer risk among the organs of the body and the length of life lost for cancer in each organ. The Commission further developed the concept of health detriment to represent the combination of the probability of occurrence of a harmful health effect with a judgment of the severity of that effect.

31880 (CONF-910529–, pp. 41-51) **Effective dose to the patient from radiopharmaceuticals calculated with the new ICRP tissue weighting factors.** Johansson, L. (Umeaa Univ. Hospital (Sweden)); Mattsson, S.; Nosslin, B.; Leide, S. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

In 1988 the ICRP Publication 53, Radiation Dose to Patients from Radiopharmaceuticals, was published. In this report effective dose equivalents to the patient from different radiopharmaceuticals were given for various ages of the patient. These data were based on the tissue weighting factors published in the recommendations from the ICRP 26. The ICRP has recently revised these weighting factors, and published new recommendations in its report ICRP 60. Based on the biokinetics data given in ICRP 53 the authors have calculated the effective dose to the adult nuclear medicine patient for all radiopharmaceuticals included in this report. Compared with the ICRP 53 data a slight decrease in the value of the effective dose can be observed for most of the radiopharmaceuticals.

31881 (CONF-910529–, pp. 52-56) **The interpretation of animal data in the calculation of doses from new radiolabeled compounds.** Naylor, G.P.L. (National Radiological Protection Board, Oxon (United Kingdom)); Ellender, M.; Harrison, J.D. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

At NRPB, dose calculations are performed for pharmaceutical companies wishing to obtain approval for human volunteer experiments. Animal data from one or more species are used to estimate the radiation doses to humans that would result from the administration of novel radiolabeled compounds. The calculations themselves are straightforward, but the animal data can be interpreted in different ways, leading to variations in the calculated dose. Doses to the gut compartments usually dominate the committed effective dose equivalent, but retention in other tissues may be important for some compounds. Long-term retention components in tissues can affect doses considerably, and the binding of many radiopharmaceuticals to melanin means that doses to the eye are particularly important. The effect of these considerations on calculating doses are considered, as well as the effect of changes in risk estimates and tissue weighting factors.

31882 (CONF-910529–, pp. 57-65) **A new approach to radiopharmaceutical dose assessment.** Desrosiers, M.F. (National Inst. of Standards and Technology, Gaithersburg, MD (United States)); Coursey, B.M. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Dosimetry for bone-seeking radiopharmaceuticals relies on an accurate measurement of the activity administered, a model for uptake of the pharmaceutical, and calculations of the dose to the target organ. The authors report here a new approach to experimental assessment of the radiation dose to bone using electron paramagnetic resonance (EPR) spectrometry. Ionizing radiations interact with mineralized bone tissue (hydroxyapatite) to produce dose-dependent concentrations of long-lived paramagnetic centers. They have successfully applied the EPR technique to bone tissues of an animal treated with a radiopharmaceutical to demonstrate its sensitivity towards radiation-induced centers in the mineralized tissue. Although the EPR bone dosimetry method is invasive, it does offer the first experimental technique for measuring and mapping the tissue response to the administered radioactivity.

31883 (CONF-910529–, pp. 66-76) **External beam and radioimmunotherapy dosimetry comparison of colorectal**

xenografts. Wessels, B.W. (George Washington Univ., Washington, DC (United States)); Yorke, E.D.; Neacy, W.P.; Sands, H. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

It is of little surprise to most experts in radiation dosimetry that the largest uncertainties associated with calculation of absorbed doses to tumor normal tissues after IV administration of radiolabeled antibodies, does not lie in the calculation methods but rather in the acquisition of time-dependent activity data. In comparison to external beam radiation dosimetry, the problems of temporal and spatial macroscopic and microscopic heterogeneities continue to confound one's best efforts. In fact in some clinical settings, only a radiobiological end-point such as hematopoietic depression is used exclusively with no reference made to absorbed dose quantitation at all. Hence in these cases, it is most practical to simply relate administered activity directly with radiobiological response. To help provide a correlation between activity, absorbed dose and radiobiological response, animal radioimmunotherapy (RIT) experiments were performed here in which the above parameters were measured and compared with multiple dose levels of external beam irradiation. Using the LS174T colorectal xenograft model in nude mice, administered activities of up to 18.5 MBq of I-131 labeled B72.3 delivered an average measured absorbed dose to tumor of 3.2 ± 0.5 cGy/3.7×10^4 Bq. This absorbed dose (1,440 cGy from a nominal 17 MBq administered activity) produced tumor growth delay values that were comparable to a dose of 2,250 cGy on average delivered by single fraction external beam radiation therapy. An average dose enhancement ratio was calculated at 1.6 for RIT as compared with external beam therapy. This enhancement ratio ranged from 1.0-2.4 for several experimental repetitions under a variety of initial conditions.

31884 (CONF-910529–, pp. 152-165) **National standards for diagnostic and therapeutic nuclides.** Coursey, B.M. (National Inst. of Standards and Technology, Gaithersburg, MD (United States)); Calhoun, J.M.; Cessna, J.; Hoppes, D.D.; Schima, F.J.; Unterweger, M.P.; Golas, D.B.; Gray, D.H. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

National standards for radionuclides used in nuclear medicine are based on activity measurements at the NIST (formerly National Bureau of Standards). Over the past 15 years standards for the diagnostic radionuclides have been developed, employing mainly $4\pi(e,x)-\gamma$ coincidence or anti-coincidence counting, as most of the diagnostic radionuclides decay by isomeric transition (e.g. ^{99m}Tc) or electron capture (e.g. ^{111}In). Recent interest in therapeutic uses of radionuclides has focused on high-energy beta-particle emitters of 1-3 day half-life. A rapid method for accurately standardizing these nuclides has been developed. The CIEMAT/NIST liquid-scintillation efficiency tracing method has been used for ^{90}Y, ^{153}Sm, ^{166}Ho, ^{186}Re and ^{188}Re. Concurrently with the activity measurements, the authors have measured half lives, probabilities per decay for key x- and gamma-rays, and radionuclidic impurities.

31885 (CONF-910529–, pp. 167-178) **Distribution of ionic indium and gallium in pregnant and nonpregnant animals.** Lathrop, K.A. (Univ. of Chicago, IL (United States)); Tsui, B.M.; Harper, P.V. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

This report provides data for total body distributions of intravenously administered, chemically similar, radionuclides of ionic indium and gallium in pregnant and nonpregnant mice; placental transfer to fetus versus time in mice, and uptake of activity in the feto-placental unit of the guinea pig, monkey, and human. In pregnant mice, which were studied in detail, there is marked sequestration of both indium and gallium in the feto-placental unit, especially toward the end of pregnancy. Renal hypertrophy associated with pregnancy further distorts the biodistribution. These findings were consistent with less detailed observations in other species including the human. Such observations indicate that biodistribution data for nonpregnant subjects are not reliable when calculating absorbed doses for pregnancy; and that distribution data for one element of a chemical group cannot be substituted for another element of that group.

31886 (CONF-910529–, pp. 179-187) **Radiation absorbed dose to the human fetal thyroid.** Watson, E.E. (Oak Ridge Associated Universities, TN (United States)). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The embryo/fetus is recognized to be particularly susceptible to damage from exposure to radiation. Many advisory groups have studied available information concerning radiation doses and radiation effects with the goal of reducing the risk to the embryo/fetus. Of particular interest are radioactive isotopes of iodine. Radioiodine taken into the body of a pregnant woman presents a possible hazard for the embryo/fetus. The fetal thyroid begins to concentrate iodine at about 13 weeks after conception and continues to do so throughout gestation. At term, the organic iodine concentration in the fetal blood is about 75% of that in the mother's blood. This paper presents a review the models that have been proposed for the calculation of the dose to the fetal thyroid from radioisotopes of iodine taken into the body of the pregnant woman as sodium iodide. A somewhat different model has been proposed, and estimates of the radiation dose to the fetal thyroid calculated from this model are given for each month of pregnancy from ^{123}I , ^{124}I , ^{125}I , and ^{131}I.

31887 (CONF-910529–, pp. 188-201) **Dosimetry of intrathecally administered radiopharmaceuticals.** Johansson, L. (Umeaa University Hospital (Sweden)); Nosslin, B. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

A model for calculation of absorbed doses from radiopharmaceuticals, such as chelates and proteins intended for intrathecal administrations, is presented. The model has been used for dose calculations in ICRP Publication 53. The model comprises both a biokinetic part, describing the transport of the substance, and the mathematical model of the anatomy of the spinal cord, used for calculation of absorbed fractions to different organs. The biokinetic model is presented in form of a compartment model, describing the net transport of the substance after cisternal or lumbar injection. A Monte Carlo program has been used to calculate specific absorbed fractions for the different 'MIRD-organs' and for the spinal cord, with a source located in different regions of the subarachnoid space.

31888 (CONF-910529–, pp. 202-218) **Prediction of radiation dose to the GI tract from analysis of blood and liver time-activity curves.** Stabin, M.G. (Oak Ridge Associated Universities, TN (United States)). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

A mathematical method is described which permits prediction of cumulative excretion of radioactivity through the gastrointestinal tract based solely on analysis of blood and liver time-activity curves. This permits estimation of radiation dose to the gastrointestinal tract organs without the need for quantitative imaging of the intestines or sampling of the feces. The method has general application; however, a few typical models are studied to show example solutions. Technetium-99m HMPAO, for which blood and liver data as well as excretion data are known, is also studied using one of the models. Matrix methods for derivation of time dependent solutions for the model compartments are discussed.

31889 (CONF-910529–, pp. 219) **Choosing representative body sizes for reference adults and children.** Cristy, M. (Oak Ridge National Lab., TN (United States)). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-84OR21400. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

In 1975 the International Commission on Radiological Protection published a report on Reference Man (ICRP Publication 23), and a task group of the ICRP is now revising that report. Currently 'Reference Man [adult male] is defined as being between 20-30 years of age, weighing 70 kg, is 170 cm in height, is a Caucasian and is a Western European or North American in habitat and custom' (ICRP 23, p. 4). A reference adult female (58 kg, 160 cm) was also defined and data on the fetus and children were given, but with less detail and fewer specific reference values because the focus of the ICRP at that time was on young male radiation workers. The 70-kg Reference Man (earlier called Standard Man) has been used in radiation protection for 40 years, including the dosimetric schema for nuclear medicine, and this 70-kg reference has been used since at least the 1920's in physiological models. As is well known, humans in most parts of the world have increased in size (height and weight) since this standard was first adopted. Taking modern European populations as a reference and expanding the age range to 20-50 years, the author now suggests 176 cm height and 73-75 kg weight for adult males and 163 cm and about 60 kg for adult females would be more appropriate. The change in height is particularly important because many anatomical and physiological parameters - e.g., lean body mass, skeletal weight, total body water, blood volume, respiratory volumes - are correlated more closely with height than with weight. The difference in lean body mass between Asian and Caucasian persons, for example, is largely or wholly due to the difference in body height. Many equations for mean body water and other whole-body measures use body height as the only or the most important parameter, and so it is important that reference body height be chosen well.

31890 (CONF-910529–, pp. 229-242) **A new mathematical model of gastrointestinal transit incorporating age- and gender-dependent physiological parameters.** Stubbs, J.B. (Oak Ridge Associated Universities, TN (United States)). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

As part of the revision by the International Commission on Radiological Protection (ICRP) of its report on Reference Man, an extensive review of the literature regarding anatomy and morphology of the gastrointestinal (GI) tract has been completed. Data on age- and gender-dependent GI physiology and motility may be included in the proposed ICRP report. A new mathematical model describing the transit of substances through the GI tract as well as the absorption and secretion of material in the GI tract has been developed. This mathematical description of GI tract kinetics utilizes more physiologically accurate transit processes than the mathematically simple, but nonphysiological, GI tract model that was used in ICRP Report 30. The proposed model uses a combination of zero- and first-order kinetics to describe motility. Some of the physiological parameters that the new model accounts for include sex, age, pathophysiological condition and meal phase (solid versus liquid). A computer algorithm, written in BASIC, based on this new model has been derived and results are compared to those of the ICRP-30 model.

31891 (CONF-910529–, pp. 243-255) **Absorbed dose calculations to blood and blood vessels for internally deposited radionuclides.** Akabani, G. (Pacific Northwest Laboratories, Richland, WA (United States)); Poston, J.W. Sr. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract FG05-88ER60707. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

At present, absorbed dose calculations for radionuclides in the human circulatory system use relatively simple models and are restricted in their applications. To determine absorbed doses to the blood and to the surface of the blood vessel wall, Monte Carlo calculations were performed using the code Electron Gamma Shower (EGS4). Absorbed doses were calculated for the blood and the blood vessel wall (lumen) for different blood vessel sizes. The radionuclides chosen for this study were those commonly used in nuclear medicine. No diffusion of the radionuclide into the blood vessel was or cross fire between blood vessels was assumed. Results are useful in assessing the doses to blood and blood vessel walls for different nuclear medicine procedures.

31892 (CONF-910529–, pp. 256-273) **Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein.** Hay, R.V. (Univ. of Chicago, IL (United States)); Ryan, J.W.; Williams, K.A.; Atcher, R.W.; Brechbiel, M.W.; Gansow, O.A.; Fleming, R.M.; Stark, V.J.; Lathrop, K.A.; Harper, P.V. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract FG02-87ER60614 ;FG02-88ER60725. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The authors propose a model to generate radiation absorbed dose estimates for radiolabeled low density lipoprotein (LDL), based upon eight studies of LDL biodistribution in three adult human subjects. Autologous plasma LDL was labeled with Tc-99m, I-123, or In-111 and injected intravenously. Biodistribution of each LDL derivative was monitored by quantitative analysis of scintigrams and direct counting of excreta and of serial blood samples. Assuming that transhepatic flux accounts for the majority of LDL clearance from the bloodstream, they obtained values of cumulated activity (Ã) and of mean dose per unit administered activity (D) for each study. In each case highest D values were calculated for liver, with mean doses of 5 rads estimated at injected activities of 27 mCi, 9 mCi, and 0.9 mCi for Tc-99m-LDL, I-123-LDL, and In-111-LDL, respectively.

31893 (CONF-910529–, pp. 274-283) **Reevaluation of S-values considering electron transport.** Akabani, G. (Pacific Northwest Laboratories, Richland, WA (United States)); Poston, J.W. Sr. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract FG05-88ER60707. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Electron-specific absorbed fractions were calculated for selected organs and regions of the mathematical reference man. The organs or regions considered were those with high surface-to-volume ratio, organs with walls, and organs that have subdivisions. The calculated specific absorbed fractions for electrons are a complement to be used with the Medical Internal Radiation Dose (MIRD) methodology. New estimates of S-values for 80 radionuclides were calculated using the new electron-specific absorbed fractions for 21 combinations of source-target regions and were compared with those already published in MIRD Pamphlet No. 11. Small differences in S-values were found by using electron specific absorbed fractions when the source organ is the target organ. However, large differences in S-values were found for those organs with walls.

31894 (CONF-910529–, pp. 284-289) **Enhancement of radiation dose to the bone marrow from backscattering of electron sources.** Kwok, C.S. (Ontario Cancer Treatment and Research

Foundation, Hamilton (Canada)); Hadjiyannakis, A.; Yu, S.K. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The absorbed fractions of continuous sources of monoenergetic electrons in marrow cavities of human bone have been previously evaluated. The difference in the scattering power of electrons in cortical bone (CB) and the red marrow (RM) was neglected. In the present work the Integrated Tiger series of radiation transport Monte Carlo codes was used to investigate the effect of the size of the marrow cavity, assumed to be spherical, on the backscatter dose to the RM. Three hundred and 500-μm radius spheres imbedded with isotropic distributions of ^{90}Y or ^{131}I were considered. The average dose increases for ^{131}I and ^{90}Y in the 500 μm radius spherical model of the marrow cavities are 5 and 4%, respectively. The average dose increases for the same nuclides in the 300-,am radius spheres are 6 and 4%, respectively.

31895 (CONF-910529–, pp. 290-296) **A model for electron and beta energy deposition within trabecular bone.** Shearer, T.W. (Texas A and M Univ., College Station (United States)); Bolch, W.E.; Poston, J.W. Sr.; Akabani, G. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract FG05-88ER60707. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

In many calculations of absorbed dose from charged particles, the irradiated media is considered to be homogeneous and boundary effects are ignored. These assumptions are acceptable in situations where the target volume is large compared to the range of the charged particles and the media is homogeneous in composition over such distances. These simplifying assumptions are not always true, and for complex structures, such as trabecular bone, more sophisticated dosimetry methods are needed. In this work, a model for electron energy deposition in bone is developed utilizing the electron transport code EGS4. For each electron history, random samplings are made of the chord length distributions through marrow cavities similar to the research of Chen and Poston. Specific parameters of the distribution are adjusted to represent both the variation of cavity size throughout the skeletal system, as well as the variation of cavity size within a particular cross section of bone. Calculations are presented in terms of absorbed fractions of energy within red bone marrow, trabeculae, and the endosteal layer for various internal distributions of a selected number of radionuclides.

31896 (CONF-910529–, pp. 297-308) **Calculations of scaled dose kernels for electrons in tissue.** Liu, J.C. (Texas A and M Univ., College Station (United States)); Akabani, G.; Bolch, W.E.; Poston, J.W. Sr. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract FG05-88ER60707. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

A calculational approach to generating scaled dose kernels for electrons is described. Each scaled dose kernel is expressed in the form of a data table consisting of 100 values representing point kernels within 100 equally divided spherical shells of a sphere of radius 1.2 times the Continuous Slowing Down Approximation (CSDA) range. The calculation begins with a determination of energy deposition for monoenergetic electrons in muscle. The data are then used to provide scaled dose kernels which are applicable in absorbed dose calculations for internally deposited radionuclides. The absorbed dose is obtained by calculating source-target distances and selecting appropriate values from the kernel tables. This algorithm for dose kernel calculations can be extended to provide composite scaled dose kernels for any β-emitting radionuclide precisely and quickly without the need for time-consuming Monte Carlo calculations.

31897 (CONF-910529–, pp. 309-333) **Point-pair distributions for internal dosimetry.** Faw, R.E. (Kansas State Univ., Manhattan (United States)); Shultis, J.K. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The purpose of this work is to show how point-pair distance distributions can be combined with point-kernel techniques to obtain a simple and computationally efficient method for many photon and electron internal dosimetry problems. The point-pair distribution p(r,T←S) for a source organ or tissue S and a target organ or tissue T is the distribution function for distances r separating randomly selected point pairs in regions T and S. The point-pair distribution is closely related to the geometry factor g(r,T←S), the fraction of all rays of length r originating in region S that end in region T. Methods are developed for using point-pair distributions in conjunction with point kernels in the evaluation of absorbed doses when source and target organs or regions are present in homogeneous attenuating media and radiation emitters are uniformly distributed in the source region. Point-pair distributions are illustrated for a number of geometries. For simple geometries, these distributions are computed analytically. For more complex shapes, Monte Carlo methods are used. Example distributions are illustrated for use in gamma-ray dosimetry involving organs such as the thyroid and bladder wall and for use in electron dosimetry involving source and target regions at the cellular level. Absorbed fraction calculations are illustrated for monoenergetic photon and electron sources. For photons, point kernels are based on ENDF/B-VI interaction coefficients and geometric-progression buildup factors. For electrons, point kernels are based on Berger's scaled point source distribution function.

31898 (CONF-910529–, pp. 334-351) **SPECTDOSE: A computerized radiation dosimetry methodology for use with radiolabeled antibodies using quantitative SPECT.** Wilson, L.A. (City of Hope National Medical Center, Duarte, CA (United States)); Properzio, W.S.; Bolch, W.E. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

A methodology incorporated into a computer program called SPECTDOSE has been developed which will allow for the calculation of absorbed doses in tissues with a nonuniform or uniform radioactivity distribution. This methodology uses quantitative Single-Photon Emission Computed Tomography (SPECT) to determine the activity concentration and volume of the source tissues and a Monte Carlo method to determine the amount of energy deposited in the target and source organs. Contrary to the standard MIRD approach, SPECTDOSE uses the actual organ and tumor volumes and activity concentrations from the SPECT image.

31899 (CONF-910529–, pp. 366-370) **Special aspects of positron dosimetry.** Harper, P.V. (Univ. of Chicago, IL (United States)); Lathrop, K.A. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

While positron dosimetry does not differ fundamentally from that of other emitters, the fact that all positron decays result in the majority of the emitted energy being deposited within a very few millimeters of its point of origin requires special consideration. Since this energy is deposited within the body the radiation absorbed dose per microcurie hour is, in general, much greater than that from the usual agents used in nuclear medicine which are deliberately chosen to have relatively little particle radiation. Consequently, the use of positron emitters is more or less limited to materials with short effective half lives. Fortunately there are a number of such nuclides, among them ^{82}Br, 75 s; ^{15}O , 2 m; ^{13}N, 10 m; ^{11}C, 20 m; ^{68}Ga, 68 m; ^{75}Br, 97 m; and ^{18}F, 108 m, which can be incorporated into biologic or xenobiotic materials. It turns out that in some cases very substantial quantities (many 10's of mCi), of such agents may be administered without exceeding acceptable radiation absorbed doses when these materials are widely dispersed in the body. Detailed human biodistribution data, accounting for all the administered radioactivity, which are required for such calculations have not in general been available in the literature. In addition, the routes of administration and excretion receive high radiation exposures. For example, with an IV administration the vessel wall may be exposed briefly to an extremely high radionuclide concentration and also, the entire IV dose passes through the lung before being dispersed through the body. Administration by inhalation, as with CO^{15}O, may result in substantial exposure to upper airways, and the interface dosimetry required to estimate such effects goes beyond MIRD methods.

31900 (CONF-910529–, pp. 371-384) **Dynamic PET scanning and compartmental model analysis to determine cellular level radiotracer distribution in vivo.** Smith, G.T. (Univ. of Tennessee, TN (United States)); Hubner, K.F.; Goodman, M.M.; Stubbs, J.B. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Positron emission tomography (PET) has been used to measure tissue radiotracer concentration in vivo. Radiochemical distribution can be determined with compartmental model analysis. A two compartment model describes the kinetics of N-13 ammonia ($^{13}NH_3$) in the myocardium. The model consists of a vascular space, Q_1 and a space for $^{13}NH_3$ bound within the tissue, Q_2. Differential equations for the model can be written: $\dot{X}(t) = AX(t) + BU(t)$, $Y(t)= CX(t)+ DU(t)$ (1) where X(t) is a column vector $[Q_1(t); Q_2(t)]$, U(t) is the arterial input activity measured from the left ventricular blood pool, and Y(t) is the measured tissue activity using PET. Matrices A, B, C, and D are dependent on physiological parameters describing the kinetics of $^{13}NH_3$ in the myocardium. Estimated parameter matrices in Equation 1 have been validated in dog experiments by measuring myocardial perfusion with dynamic PET scanning and intravenous injection of ^{13} NH_3. Tracer concentrations for each compartment can be calculated by direct integration of Equation 1. If the cellular level distribution of each compartment is known, the concentration of tracer within the intracellular and extracellular space can be determined. Applications of this type of modeling include parameter estimation for measurement of physiological processes, organ level dosimetry, and determination of cellular radiotracer distribution.

31901 (CONF-910529–, pp. 385-395) **An approach to cellular level dosimetry using compartmental model analysis and dynamic PET.** Stubbs, J.B. (Oak Ridge Associated Universities, TN (United States)); Stabin, M.G.; Smith, G.T.; Eckerman, K.F.; Turner, J.E. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The kinetic parameters of a compartmental model, describing the biokinetics of nitrogen-13 labeled ammonia (^{13} NH_3) in human cardiac tissue, have been estimated from dynamic PET scans. Equations describing the temporal behavior of the ^{13} NH_3 in the intra- and extracellular spaces were derived from this model. Integration of these equations, coupled with the energy density (keV/unit volume), yield a cumulative measure of the total energy deposition in the intra- and extracellular spaces. The energy density was derived from a previously published point kernel. Thus a direct calculation of the cellular level absorbed dose, based on patient-specific dynamic PET scan data, was possible. Using the nuclear mass fraction for cardiac tissue, the authors estimated the nuclear absorbed dose for normal and ischemic cardiac tissue at rest and under stress. The mean number of 'hits' in the nuclei was estimated and from this number, the percentage of cardiac cells inactivated (Cell Kill, or CK Index) can be estimated. This technique has promise for treatment planning in radioimmunotherapy and for palliative therapy in bone cancer. Using quantitative imaging (e.g., PET or SPECT), single-tissue kinetic modeling and calculations of regional tissue- specific energy depositions for other radiopharmaceuticals, it may be possible to estimate the cellular-level effectiveness of radionuclide therapy via calculation of the CK index.

31902 (CONF-910529–, pp. 396-418) **Application of PET and compartmental modeling in estimation of cellular level microdosimetry: PET studies of I-124 labeled 3F8 MAb in human glioma.** Daghighian, F. (Memorial Sloan-Kettering Cancer Center, New York, NY (United States)); Pentlow, K.S.; Larson, S.M.; Graham, M.C.; DiResta, G.R.; Yeh, S.D.J.; Macapinlac, H.; Finn, R.D.; Arbit, E.; Cheung, N.K.V. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The authors present a method to estimate the radiation dose deposited in tumor cells by radiolabeled antibody using PET and tracer kinetic modeling. A patient with a glioma was injected with 96.2 MBq of I-124 labeled 3F8, a murine antibody (IgG3) specific against the ganglioside G_{D2}. Serial PET scans and plasma samples were taken over 11 days. A 3-compartmental model was used to estimate the plasma-to- tumor transfer constant (K_1); the tumor-to-plasma transfer constant (k_2), the association and dissociation constants (k_3, k_4) of antibody binding; and the binding potential, BP. Tumor radioactivity peaked at 18 hours at 0.0045 %IA/g. The kinetic parameters were estimated to be: $K_1 = 0.048$ ml/h/g, $k_2 = 0.16\ h^{-1}$, $k_3 = 0.03\ h^{-1}$, $k_4 = 0.015\ h^{-1}$, and BP = 2.25. Based on these kinetic parameters, the amount of tumor-bound radiolabeled MAb was calculated, and from this the dose deposited to the cell nucleus from Auger electrons was estimated to be 0.24 keV per tumor cell nucleus per MBq injected. This method permits microdosimetric estimates to be made at the cellular level based on in-vivo noninvasive measurements.

31903 (CONF-910529–, pp. 434-443) **Radiation dosimetry for Tc-99m MAG3 in adults and children.** Stabin, M.G. (Oak Ridge Associated Universities, TN (United States)); Taylor, A. Jr.; Conway, J.J.; Eshima, D.; Wooten, W.; Halama, J. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Radiation dose estimates were calculated for the renal agents Tc-99m DTPA, Tc-99m MAG3, and I-131 OIH from biodistribution data gathered in groups of healthy human volunteers and in a few children of various ages. Biokinetics were evaluated by Anger camera imaging, blood sampling, and urine collection and counting. Collected data were fit to four or five compartmental models using the Simulation, Analysis, And Modeling (SAAM) software. Radiation dose estimates were performed using standard MIRD techniques. Average residence times in urinary bladder, kidney, and remainder of the body were used to predict radiation doses for the three agents. Doses for DTPA and MAG3 were very similar and much lower on a per unit injected activity than OIH. Residence times for the children were fairly similar for most organs, and the radiation dose estimates varied mostly according to the organ masses.

31904 (CONF-910529–, pp. 444-456) **Biokinetics and dosimetry of Tc-99m HM-PAO in children.** Vestergren, E. (Univ. of Goeteborg (Sweden)); Jacobsson, L.; Bjure, J.; Sixt, R.; Uvebrant, P.; Mattsson, S.; Johansson, L. American Society of

Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The aim of this investigation was to study the biokinetics of Tc-99m HM-PAO in children of different ages and to calculate the mean absorbed dose to various organs as well as the effective dose. Eight children aged between 7 weeks and 18 years were scanned with a gamma camera in anterior and posterior views at 1, 7 and 24 hours post-injection. The activity in the brain, lungs, liver, kidneys and in the intestines was quantified. Urine was collected during a 24-hour period. The fraction of activity taken up in the brain shows a strong age-dependence with higher values for young children. There also seems to be a weak age- dependence for the liver uptake. For the other measured organs, there was no significant age-dependence. After 24 hours, the fraction of injected activity excreted in urine was on the average 35% (corrected for physical decay). The mean absorbed dose to the total body and the effective dose (calculated with the same weighting factors for children as for adults) is 12 times higher per unit activity for a newborn than for an adult. However, if the activity at an investigation is administered in proportion to the body weight, the effective dose to children of all ages is close to the effective dose to an adult.

31905 (CONF-910529–, pp. 457-466) **An alternative to convolution integrals for radiation absorbed dose calculations.** Stabin, M.G. (Oak Ridge Associated Universities, TN (United States)); Watson, E.E. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-76OR00033. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

A simple method is shown which estimates the cumulated activity in a compartment which receives a time-varying input, without the use of convolution integrals. The method can be used in place of a convolution integral calculation if only cumulated activity is needed. The method does not give the expression for the time- dependence of activity in the compartment, only the integral of this function. If the time dependence must be known, convolution integrals or an equivalent method are needed.

31906 (CONF-910529–, pp. 483-497) **In vivo distribution and dosimetry of Tc-99m MIBI in man.** Leide, S. (Malmoe General Hospital (Sweden)); Diemer, H.; Ahlgren, L.; Mattsson, S. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The biodistribution and dosimetry of Tc-99m MIBI (methoxy isobutyl isonitrile) which is used for myocardial imaging have been evaluated in 10 patients, 5 at rest and 5 under stress. After an intravenous injection the substance is rapidly cleared from the blood and taken up in various tissues and organs. The substance is mainly eliminated through the hepatobiliary system and excreted via the gall bladder through the gastrointestinal tract and through the kidneys. These organs will also get the highest absorbed doses, (2.6-6.7) 10^{-2} mGy/MBq. The effective dose was calculated to be 1.1×10^{-2} mSv/MBq. A typical examination starting with 500 MBq under stress and continuing with 700 MBq at rest will give an effective dose of 13 mSv which is very similar to that of an examination with 80 MBq T1-201.

31907 (CONF-910529–, pp. 531-543) **Development and validation of a simple model for cellular and cell cluster dosimetry with practical application in targeted radionuclide therapy.** Bardies, M. (Inst. National de la Sante et de la Recherche Medicale, Nantes (France)); Myers, M.J. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

The authors have developed an analytical technique for calculating the mean absorbed dose to the cell nucleus from a variety of spatial distributions of cells and activities and a wide range of emitted energies and radionuclides. The dose to the nucleus has been calculated using this method from activity distributed (1) on the cell surface (2) throughout the cytoplasm (3) throughout a cluster of cells (micrometastasis) and (4) on the surface of the cluster of cells. The derived absorption factors have been based on the latest point kernels of Berger and have been validated against published estimates. They show good agreement and the model has the advantage of being easily adapted for revisions and extensions of available low energy data. Data sets may be derived with the absorbed fractions or the absorbed dose per emission as a function of the radial extent of the activity, and either the individual energies of the emissions or the totality of the emissions from a particular radio-nuclide. The practical applications of the model have included: (a) calculation of the absorbed dose to radioimmunotargeted micrometastasis in the peritoneum; (b) calculations of doses to cells labelled on the surface with some novel emitters such as ^{67}Cu, ^{177} Lu, ^{153}Sm, ^{111}Ag, ^{186} Re, ^{188}Re as well as ^{131}I, ^{125}I and ^{90}Y; (c) comparison of doses to the cell nucleus from MIBG labelled with ^{125}I and ^{131}I and distributed in the cytoplasm of the cell; and (d) estimates of the absorbed dose to the cell nucleus from alpha emitters distributed on the surface of the cell.

31908 (CONF-910529–, pp. 557-576) **X-ray and radioiodine dose to thyroid follicular cells.** Faw, R.E. (Kansas State Univ., Manhattan (United States)); Eckerman, K.F.; Ryman, J.C. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. DOE Contract AC05-84OR21400. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Radiation doses to the epithelial cells of thyroid follicles have been calculated for internal exposure by radionuclides of iodine and by secondary radiations created as a result of interactions of externally administered x rays with iodine naturally occurring in the thyroid. Calculations were performed for the thyroids of subjects ranging from the newborn to the adult male. Results for internal radionuclides are reported as the dose rate to follicular-cell nuclei per unit specific activity of the radionuclide in the thyroid as a whole, i.e., as the specific 'S value' as used in the MIRD method for internal dosimetry. Results for x rays are reported as the response function, i.e., the absorbed dose per unit fluence of primary x rays. Dose rates are subdivided into internal and external components, the former from radiations emitted within the colloid volume of any one follicle, and the latter from radiations emitted throughout the thyroid in follicles surrounding that one follicle.

31909 (CONF-910529–, pp. 577-588) **The application of the distance histogram in microdosimetry for evaluating heterogeneity.** Dieren, E.B. van (Free University Hospital, Amsterdam (Netherlands)); Lingen, A. van; Roos, J.C.; Teule, G.J.J. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States). May 1992. From 5. international radiopharmaceutical dosimetry symposium; Oak Ridge, TN (United States); 7-10 May 1991. In *Fifth international radiopharmaceutical dosimetry symposium.* 625p. Order Number DE92013066. Source: OSTI; NTIS; INIS.

Heterogeneity of radionuclide distributions at a microscopic level is relevant for the dosimetry of short path-length emissions. The present study explores the methodological aspects and the limitations of source target histograms by using computer simulations of radionuclide distributions. Sources were formed by labeled cells, containing 50 decay sites each. Cell nuclei were considered as targets. Within a matrix of 2,500 cells, the authors investigated uniform distributions (MIRD assumption), various cluster sizes, the single labeled cell, and a random distribution. Furthermore, four different intracellular source localizations were studied in a matrix of one cell. The distance histograms for both matrices were combined. For both ^{125}I and ^{131}I , absorbed doses in the targets were calculated from multiplication of the distance histograms by the point source absorbed radiation dose distribution. The presented results indicate that the use of distance histograms might be a mathematically convenient approach to microdosimetrical studies. They provide a means to study combinations of source distributions at various levels of magnification for several radionuclides within a reasonable calculation time.

31910 (DOE/ER/60600–2) **[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1989.** Zamenhof, R.G. New England Medical Center, Boston, MA (United States). [1989]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER60600. Order Number DE92040179. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes accomplishments by this laboratory concerning development of high-resolution alpha-autoradiography design of an optimized epithermal neutron beam dosimetry and treatment planning Using Monte Carlo techniques development of a prompt-gamma ^{10}B analysis facility.

31911 (DOE/ER/60951–3) **[Development and recommendations in the area of ionizing and nonionizing radiations]: Progress report, 1 September 1991–30 April 1992.** National Council on Radiation Protection and Measurements, Bethesda, MD (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-90ER60951. Order Number DE92019846. Source: OSTI; NTIS; GPO Dep.

This report briefly describes seven publications produced in 1991–1992 under the auspices of the National Council on Radiation Protection and Measurements. In addition current status of additional publications in preparation are outlined.

31912 (DOE/ER/61029–9) **Study of the atmospheric chemistry of radon progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992.** Hopke, P.K. Clarkson Univ., Potsdam, NY (United States). Dept. of Chemistry. Jul 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER61029. Order Number DE92019169. Source: OSTI; NTIS; GPO Dep.

This report covers the second year of the 28 month grant current grant to Clarkson University to study the chemical and physical behavior of the polonium 218 atom immediately following its formation by the alpha decay of radon. Because small changes in size for activity result in large changes in the delivered dose per unit exposure, this behavior must be understood if the exposure to radon progeny and it dose to the cells in the respiratory tract are to be fully assessed. Two areas of radon progeny behavior are being pursued; laboratory studies under controlled conditions to better understand the fundamental physical and chemical process that affect the progeny's atmospheric behavior and studies in actual indoor environments to develop a better assessment of the exposure of the occupants of that space to the size and concentration of the indoor radioactive aerosol. This report describes the progress toward achieving these objectives.

31913 (DOE/ER/61150–1, pp. 2) **Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on platelet kinetics in Beagle dogs: Comparison with In-111 labeled platelets.** Dewanjee, M.K. (Univ. of Miami, FL (United States)); Ghafouripour, A.K.; Kapadvanjwala, M.; Ganz, W.I.; Serafini, A.N.; Sfakianakis, G.N. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The clearance of stereoisomer of (d,l) Tc-99m HMPAO from the brain was found slower than that of meso isomer. The authors wanted to test the hypothesis, whether this difference of cerebral-clearance also holds true for Tc-99m HMPAO labeled autologous platelets. They carried platelet-kinetics with both stereoisomers. HMPAO stereoisomers were synthesized and separated by fractional crystallization (8X). Sn(II)-HMPAO kits were prepared and lyophilized. Forty three milliliters of blood were collected in 7 ml of ACD anticoagulant and platelet-labeling was carried out in ACD-saline media with 40-50 mCi of freshly eluted Tc-99m pertechnetate from M-99– > Tc-99m generator. Time-dependence of platelet-uptake was studied by incubation of aliquots of platelets with stereoisomers of Tc-99m HMPAO. Platelet-kinetics were repeated five times in two conditioned Beagle dogs after injection of 30-35 mCi of Tc-99m labeled autologous platelets. Serial blood samples were obtained by veni-puncture at 10, 30, 120, 240, 320 minutes, 24, 48 and 72 hours. The blood samples were centrifuged and radioactivity in plasma and cell pellet was determined with a gamma-counter. After lysing the labeled platelets the Tc-99m radioactivity in the cytoplasmic proteins and organelles was determined with a gamma-counter; 50-60% of the radioactivity in the cytoplasm was protein-bound. The values of mean and standard deviation of labeling efficiency, platelet-survival time (exponential) and recovery were calculated and tabulated.

31914 (DOE/ER/61150–1, pp. 3) **^{153}Sm-EDTMP and ^{99m}Tc-EDTMP - The radiopharmacology of two potential bone metastasis radiopharmaceuticals.** Hiltunen, J.V. (MAP Medical Technologies Inc., Espoo (Finland)); Nikula, T.K.; Penttilae, P.I.; Bergstroem, K.; Mussalo, H.; Kuikka, J.T.; Laensimies, E. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

While $^{153}Sm^{3+}$ binds directly to EDTMP in aqueous media at pH 7.5, $^{99m}TcO_4-$ has first to be reduced to valence state +5 until it is capable of forming stable binding with EDTMP. After labeling both are buffered, made isotonic and sterilized to form injectable solutions. ^{153}Sm-EDTMP is known to be stable in vivo. In this study ^{99m}Tc-EDTMP was found to be stable in vitro even at high specific activities for at least 48 hrs. Both radiopharmaceuticals showed rapid uptake to bones. All the large bones were clearly visible at early images. Blood clearance was fast. The unbound pharmaceuticals excreted rapidly through kidneys, more than 60% of injected dose was removed within first day in both cases. The biodistributions at 24 hrs pi showed activities/gram of organ to decrease in the pattern: large bones (knees, back bone) > kidneys > liver > other organs in both cases. The ^{99m}Tc-EDTMP showed some 1,5 times higher bone-to-other tissue ratios than ^{153}Sm-EDTMP. The later biodistributions showed similar patterns. The bones retained activity better than other tissues, so that bone-to other organ ratios increased. The same difference between ^{99m}Tc and ^{153}Sm was preserved. These results suggest that the two radiopharmaceuticals may be useful in treatment and diagnosis of bone metastasis.

31915 (DOE/ER/61150–1, pp. 21) **Structure-activity relationships among nitroimidazole nucleosides used as markers of tissue hypoxia.** Wiebe, L.I. (Univ. of Alberta, Edmonton (Canada)); Mannan, R.H.; Mercer, J.R.; Chapman, J.D.; Haverland, G.W. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Lipophilicity and singly electron reduction potential (E_7^1) have been identified as the principle physico-chemical properties that govern both the efficacy and the toxicity of nitroimidazole radiosensitizers. A new generation of 2-nitroimidazole derivatives, the N-1 glycosides, have now been synthesized and tested in in vitro and in vivo biological systems. Data include measurements of lipophilicity (P) and in vitro cytotoxicity, sensitizer enhancement ratios (SER), sensitizer binding rates and oxygen-dependent binding. In vivo studies include biodistribution, excretion and (hypoxic) tumor uptake in an animal tumor model. Data analysis indicates a complex set of interrelationships among the parameters measured. In general terms, SER can be defined as a function of cytotoxicity and binding rate, but these parameters can be related to P only within narrow structural parameters. Uptake by hypoxic tumors in vivo does not appear to be a function of either P or SER. Original data and derived correlative data are presented and discussed in detail.

31916 (DOE/ER/61150–1, pp. 28) **Tissue localization of ^{125}I-Triiodothyronine in the periorbital area of mice: A microautoradiographic study.** Sawas-Dimopoulou, C. (Univ. of Athens (Greece)); Papanastasiou, E.; Angelis, A.; Margaritis, L. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

A significant retention of ^{125}I-Triiodothyronine (^{125}I-T_3) in the retrobulbar orbital area of mice has been previously shown. The present study was initiated to determine tissue and intracellular localization of the thyroid hormone in the above area which is concerned in human Grave's disease of thyroid. Male and female Balb C mice were intravenously injected with 0.1 ml ^{125}I-T_3 (0.2 mCi/μg). Light microscope autoradiography demonstrated that ^{125}I-T_3 injected intravenously is rapidly transported in the cells of tissues of the peribulbar orbital area, with glandular or muscular function: the hormone showed a high affinity for the intra- and extraorbital lachrymal gland cells, the cells of the Harder's gland, those of the sebaceous and meibronian glands of the eyelids, as well as for local muscular structures. Electron microscope autoradiography showed that radioactivity is already localized inside the cells 30 seconds after the i.v. injection of ^{125}I-T_3 and distributed throughout the cytoplasm, with a higher concentration in the vesicles of the Harderian gland cells (rich in porphyrin and lipids), in the endoplasmic reticulum and the mitochondria of the lachrymal glands. Ten min. after injection, a shifting of the radioactivity towards the nucleus area was observed.

31917 (DOE/ER/61150–1, pp. 42) **Enhancement of liver uptake of a radioiodinated triglyceride analog by prior incorporation into a lipoprotein-like emulsion.** Schwendner, S.W. (Univ. of Michigan, Ann Arbor (United States)); Ruyan, M.; Counsell, R.E.; Skinner, R.W.S. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

A radioiodinated triglyceride analog, (^{125}I)-glycerol-2-palmitoyl-1,3-di-15-(p-iodophenyl)pentadecanoate (DPPG) has been synthesized and administered to rats formulated in a detergent-saline vehicle. Upon intravenous administration to female rats, the compound rapidly becomes associated with plasma lipoproteins, especially high density lipoprotein (HDL) as shown by polyacrylamide gel electrophoresis. By 15 min following administration 52% of the dose accumulates within the liver. With time, the radioactivity clears and more activity appears as the fatty acid metabolite than as parent compound. Administration of DPPG to rats with altered lipoprotein metabolism including decreased hepatic triglyceride lipase (HL), such as streptozotocin-induced diabetic rats or rats chronically fed ethanol, show a decrease in liver uptake of radioactivity and a delay in clearance of the DPPG. Similar results were obtained noninvasively with gamma camera scintigraphy.

31918 (DOE/ER/61150–1, pp. 55) **Tissue distribution and biokinetics of radiolabeled proteins in rats with a focal infection.** Claessens, R.A.M.J. (University Hospital, Nijmegen (Netherlands)); Oyen, W.J.G.; Meer, J.W.M. van der; Corstens, F.H.M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In order to evaluate the influence of both the type of radionuclide and protein on accumulation of radiolabeled human non-specific immunoglobulin G in infectious foci, six combinations of three proteins and three radiolabels were studied in rats. In-111 labeled human immunoglobulin G (IgG), I-123-IgG, Tc-99m-IgG, In-111 labeled human serum albumin (HSA), I-131-HSA, and In-111 human immunoglobulin A (IgA) were administered intravenously to rats with a calf muscle infection due to Staphylococcus aureus. For labeling with In-111 the proteins were conjugated to DTPA using DTPA bicyclic anhydride. Labeling with I-123 was performed by means of the iodogen method. The tissue distribution, expressed as percentage of injected dose per gram tissue, was determined at 2, 6, 24, and 48 hours after injection in groups of six rats. For all the preparations studied at all sampling times a marked difference was found between the uptake in the infected and the normal calf muscle. At 2 and 6 hr. p.i. the abscess uptake for indium labeled and iodinated IgG as well as for both HSA preparations showed no major differences. However the abscess uptake for IgA was markedly lower than for the other preparations. This could be attributed to the high uptake of In-111-IgA in liver, spleen, and kidneys, causing a rapid fall in blood concentration of IgA. From 6 hr. on the abscess uptake of I-131-HSA and, to a lesser degree, Tc-99m-IgG and I-123-IgG showed a decreasing trend. To the contrary, the indium labeled preparations were retained in the abscesses and in the other tissues.

31919 (DOE/ER/61150–1, pp. 60) **[^{35}S] cysteamine and 2-aminoethylisothio uronium bromide hydrobromide: Improved syntheses, biodistributions and implications of protection from radionuclides.** Harapanhalli, R.S. (Univ. of Medicine and Dentistry of New Jersey, Newark (United States)); Narra, V.R.; Howell, R.W.; Rao, D.V.; Sastry, K.S.R. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

In the present work, high specific activity [^{35}S] MEA and AET were synthesized by improved methods of one-pot approach and were used for biodistribution studies in mice. In order to find basis for observed radioprotection, testicular retention of the activity was established over extended time (144h) after i.t. injections of the labeled chemicals. In view of the practical considerations for systemic versus local administration, the activity distributions were determined (0.25-144 h) in various organs by giving trace quantities of these chemicals orally ($\sim$ 1 μg per gram body weight of mouse). The results were expressed as percent activity per gram organ and were compared with earlier literature on higher quantities of administered chemicals. The distribution of activity in radiosensitive organs namely testis and bone marrow was studied at the microscopic level by cell fractionation methods. The details of advantages of improved syntheses and the significance of biodistribution data are discussed along with the implications of protection from incorporated radionuclides in vivo.

31920 (DOE/ER/61150–1, pp. 61) **Elevated brain uptake of ^{59} citrate: Correlation with the critical period of brain development in experimental phenylketonuria.** Sawas-Dimopoulou, C. (National Center for Scientific Research Demokritos, Attiki (Greece)); Soulpi, K. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Altered biochemistry in a critical period of brain development can provoke significant and sometimes definitive changes in brain physiology by a mechanism not quite clear. The present work has been designed to determine the critical age of brain development in which phenylketonuria can induce definite changes in adult age. Wistar rats in groups of 8 were made phenylketonuric by a 5d series of i.p. injections of p-Chlorophenylalanine (p-Chl) and phenylalanine (Phe) beginning at 8 or 22, 28, 43 and 54 d after birth. In parallel series, rats received only Phe, whereas the litter-mate controls were injected with saline. At the age of 60 d, the animals were i.v. injected with ^{59}Fe citrate and a 6 hr-biodistribution study was performed. A significant increase of ^{59}Fe-brain concentration was shown when the newborn rats were made phenylketonuric by p-Chl+Phe treatment at the age of 8 to 12 d. The results suggest that in the developing brain, phenylketonuria in the period from 8 to 12 d after birth is critical in inducing definite changes of brain iron metabolism.

31921 (DOE/ER/61150–1, pp. 78) **Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on ligand exchange and**

binding with hemoglobin: Comparison with In-111 tropolone. Dewanjee, M.K. (Univ. of Miami School of Medicine, FL (United States)); Ghafouripour, A.K.; Kapadvanjwala, M.; Ganz, W.I.; Serafini, A.N.; Sfakianakis, G.N. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

The binding of Tc-HMPAO to intracellular proteins results in the retention of Tc-HMPAO in the labeled cellular elements of blood and brain. The authors studied the kinetics of binding of stereoisomers of Tc-99m HMPAO directly to hemoglobin and RBC-uptake by incubation using canine red cells. HMPAO stereoisomers were synthesized in the laboratory and separated by fractional crystallization (8X). Sn(II)-HMPAO kits were prepared and lyophilized. Forty three milliliters of blood were collected in 7 ml of ACD anticoagulant and RBC-labeling was carried out in ACD-saline media. After incubation for 60 minutes, the labeled RBCs were washed and lysed with water and hemoglobin was separated from membrane by centrifugation and membrane-filtration. Hemoglobin separated by RBC-lysis with water was centrifuged and aliquots were incubated with stereoisomers of Tc-99m HMPAO (100 uCi). The Tc-99m bound hemoglobin was separated by precipitation with absolute ethanol and 20% trichloroacetic acid. The results of uptake and binding with hemoglobin and globin are tabulated. The kinetics of RBC uptake of both isomers is similar; although the labeling efficiency with meso is lower than that of d,1 stereoisomer (75% vs. 85%). The membrane retards the binding of Tc-HMPAO to hemoglobin. The direct binding of the stereoisomers to hemoglobin reaches saturation level instantaneously. Ligand exchange of Tc-HMPAO to sulfhydryl-rich segment of hemoglobin may result in binding and retention of Tc-HMPAO to red cells.

31922 (INFO–0417-1) **Occupational radiation exposure and mortality study: Internal linkage of the Canadian National Dose Registry.** Coppock, E. (Statistics Canada, Ottawa, ON (Canada)); Dobson, D.; Fair, M. Atomic Energy Control Board, Ottawa, ON (Canada). Jun 1992. 64p. Order Number DE92644040. Source: OSTI; NTIS (US Sales Only); INIS.

An epidemiological cohort study of some 300,000 Canadians enrolled in the National Dose Registry (NDR) is being undertaken to determine if there is excess cancer or other causes of mortality among those workers who are occupationally exposed to low levels of ionizing radiation. The results of this study may provide better understanding of the dose-response relationship for low doses of ionizing radiation and aid in the verification of risk estimates for radiation-induced cancer mortality. The Department of National Health and Welfare (DNHW) is responsible for the Registry; this study is being carried out by the Bureau of Radiation and Medical Devices (BRMD) with financial assistance and co-operation of various agencies including Statistics Canada and the Atomic Energy Control Board.

31923 (INIS-BR–2924, pp. 25) **Integrated control of Sclerotinia sclerotiorum with Benomyl and and Trichoderma harzianum resistant to benzimidazoles.** Melo, I.S. (Empresa Brasileira de Pesquisa Agropecuaria, Jaguariuna, SP (Brazil). Centro Nacional de Pesquisa de Defesa da Agricultura); Silva, A.C.F.; Cassiolato, A.M. Empresa Brasileira de Pesquisa Agropecuaria, Campinas, SP (Brazil). Centro Nacional de Pesquisa de Defesa da Agricultura. 1991. 3p. (In Portuguese). (CONF-9110405–: 4. Brazilian meeting on biological control of plant diseases, Campinas (Brazil), 8 Oct 1991). In *Proceedings of the 4. Brazilian Meeting on Biological Control of Plant Diseases.* Order Number DE93000804. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. FUNGI/ultraviolet radiation; BENZIMIDAZOLES; FUNGI; PESTICIDES

31924 (INIS-mf–13215) **Symposium dedicated to actual problems in radiation safety.** Israel Radiation Protection Association (Israel). Apr 1990. 60p. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

Some of Israel's factual problems in radiation protection in public health are discussed.

31925 (INIS-mf–13215, pp. 2-8) **Carcinogenic risks from exposure to non-ionizing radiation: Updated in accordance with the latest findings of the commitees ICRP, BEIR and UNSCEAR.** Sclesinger, T. (Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center). Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

Ionizing radiations carcinogenic potential may be defined as increase in deaths rate in the exposed population. The latest international recommendation, for workers radiation protection, are reviewed.

31926 (INIS-mf–13215, pp. 9-16) **The biological effects of exposure to RF radiation.** Margaliot, M. (Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center); Rupin, R.; Amir, S. Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

Radiowave biological effects and safe utilization regulations are reviewed.

31927 (INIS-mf–13215, pp. 51-54) **Risk assessment - benefit in scanning medical examination for early detection of breast cancer by means of mammography.** Thatcher, M. (Rambam Government Hospital, Haifa (Israel)); Fireman, S.; Sclesinger, T. Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

Mammography mass use, for early detection of breast cancer in women population, are assessed for its risks and benefits.

31928 (INIS-mf–13215, pp. 24-31) **Radon - its concentrations and hazards in the world and in Israel.** Shanai, Y. (Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center); Margaliot, M.; Sclesinger, T. Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

Radon's problem is reviewed.

31929 (INIS-mf–13215, pp. 47-50) **Patients protection during diagnosis and therapy with ionizing radiation: ICRO recommendations.** Sclesinger, T. (Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center). Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

ICRP recommendations, concerning patients protection during treatment with ionizing radiations, are reviewed.

31930 (INIS-mf–13215, pp. 55-60) **New developments in personal dosimetry.** Ben-Shachar, B. (Israel Atomic Energy Commission, Beersheba (Israel). Nuclear Research Center-Negev). Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

Latest developments in personal dosimetry are reviewed.

31931 (INIS-mf–13347, pp. 25) **Lung cancer induction in rats by radon daughter exposure: Status as of 1984 on low**

doses effects. Chameaud, J.; Masse, R.; Lafuma, J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. CARCINOMAS/dose-response relationships; CARCINOMAS; DAUGHTER PRODUCTS; LUNGS; MINERS; RADON 222; RATS; URANIUM MINES

31932 (INIS-mf–13347, pp. 8) **The United States uranium registry tissue program: An update.** Moore, R.H. (Hanford Environmental Health Foundation, Richland, WA (United States)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. TISSUES/sampling; BIOLOGICAL RADIATION EFFECTS; HUMAN POPULATIONS; PERSONNEL; TISSUES; SAMPLING; URANIUM

31933 (INIS-mf–13347, pp. 22-23) **Inherent dosimetric and epidemiological uncertainties associated with lung cancer risk assessment for mining populations.** Steinhausler, F. (Salzburg Univ. (Austria)); Hofmann, W. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/carcinomas; DOSIMETRY; DUSTS; GAMMA RADIATION; LUNGS; MINERS; CARCINOMAS; RADIATION DOSES; RADON 222; RISK ASSESSMENT; URANIUM ORES

31934 (INIS-mf–13347, pp. 23-24) **The Ontario miners mortality study 1955-1977: Progress report.** Muller, J.; Wheeler, W.; Gentleman, J.; Suranyi, G.; Kusiak, R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/mortality; CARCINOMAS; LUNGS; MINERS; MORTALITY; ONTARIO; URANIUM MINES

31935 (INIS-mf–13347, pp. 24) **Actual state of the epidemiological study of uranium miners in France.** Tirmarche, M. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)); Brenot, J.; Piechowski, J.; Pradel, J.; Chameaud, J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/carcinomas; DAUGHTER PRODUCTS; FRANCE; LUNGS; MINERS; CARCINOMAS; MORTALITY; RADON 222; URANIUM MINES

31936 (INIS-mf–13347, pp. 25) **Mortality experience among workers in the uranium industry.** Nair, R.C.; Abbatt, J.D.; Howe, G.R.; Newcombe, H.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/mortality; CARCINOMAS; FEED MATERIALS PLANTS; LUNGS; MINERS; MORTALITY; RISK ASSESSMENT; URANIUM MINES

31937 (INIS-mf–13347, pp. 26) **Lung cancer mortality and radiation exposure among the Newfoundland fluorspar miners.** Morrison, H.I. (Department of National Health and Welfare, Ottawa, ON (Canada)); Semenciw, R.M.; Mao, Y.; deVillier, A.J.; Wigle, D.T.; Corkill, D.A.; Dory, A.B.; Stocker, H. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/mortality; CARCINOMAS; DAUGHTER PRODUCTS; LUNGS; MINERS; MORTALITY; RADON 222

31938 (INIS-mf–13347, pp. 44-45) **A flexible computer model for radon daughter exposure health risk assessment.** Ginevan, M.E. (Nuclear Regulatory Commission, Washington, DC (United States)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. CARCINOMAS/risk assessment; CARCINOMAS; COMPUTERIZED SIMULATION; DAUGHTER PRODUCTS; LUNGS; RADON 222

31939 (INIS-mf–13347, pp. 47) **Studies of Grants, New Mexico, uranium miners.** Samet, J.M. (New Mexico Univ., Albuquerque, NM (United States)); Morgan, M.V.; Valdivia, A.A.; Key, C.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/mortality; MINERS; MORTALITY; NEW MEXICO; RADIATION DOSES; URANIUM MINES

31940 (INIS-mf–13347, pp. 47) **Impact of occupational hazards on the life expectancy of uranium miners.** Myers, D.K. (Atomic Energy of Canada Ltd., Chalk River, ON (Canada). Chalk River Nuclear Labs.); Johnson, J.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/occupational exposure; MINERS; MORTALITY; URANIUM MINES

31941 (INIS-mf–13347, pp. 47-48) **Update of the United States Public Health Service uranium miners cohort study.** Roscoe, R.J. (National Inst. for Occupational Safety and Health, Cincinnati, OH (United States)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/mortality; CARCINOMAS; LUNGS; MINERS; MORTALITY; RESEARCH PROGRAMS; URANIUM MINES; USA

31942 (INIS-mf–13347, pp. 48) **Incidence and development of lung cancer due to cigarette smoking and radiation exposure in uranium miners.** Saccomanno, G. (Saint Mary's Hospital, Grand Junction, CO (United States)); Yale, C.; Dixon, W.; Auerbach, O. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/carcinomas; LUNGS; MINERS; CARCINOMAS; TOBACCO SMOKES; TUMOR CELLS; URANIUM MINES

31943 (INIS-mf–13347, pp. 49) **Sex ratio of first-born children of United States uranium miners.** Roscoe, R.J. (National

Inst. for Occupational Safety and Health, Cincinnati, OH (United States)); Waxweiler, R.J.; Archer, V.E. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/progeny; AGE DEPENDENCE; GENETIC RADIATION EFFECTS; MINERS; PROGENY; RADIATION DOSES; SEX RATIO; URANIUM MINES

31944 (INIS-mf–13347, pp. 41) **The dynamic theory of clusters.** Hawrynski, M.J. (Institute of Occupational Medicine, Lodz (Poland)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/aerosols; AIR; CATIONS; DAUGHTER PRODUCTS; HUMIDITY; PARTICLE SIZE; AEROSOLS

31945 (INIS-mf–13347, pp. 19) **Uranium measurements in urine: A summary of the operating experience at Canadian uranium mills.** Napier, W.A. (Atomic Energy Control Board, Ottawa, ON (Canada)); Smart, B.C. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. URINE/uranium oxides u3o8; CANADA; FEED MATERIALS PLANTS; PERSONNEL; PERSONNEL DOSIMETRY; URINE

31946 (INIS-mf–13347, pp. 19) **Comparing personal alpha dosimetry with the conventional area monitoring-time weighting methods of exposure estimation.** Balint, A.B. (Atomic Energy Control Board, Ottawa, ON (Canada)); Viljoen, J. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/personnel dosimetry; ALPHA DOSIMETRY; EMANOMETERS; MINERS; URANIUM MINES

31947 (INIS-mf–13347, pp. 20) **Experimental verification of the theory of clusters.** Hawrynski, M.J. (Institute of Occupational Medicine, Lodz (Poland)). Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/aerosols; AIR; CATIONS; DAUGHTER PRODUCTS; HUMIDITY; MINES; AEROSOLS

31948 (INIS-mf–13347, pp. 27) **Thermophoretic collection of radon daughters with potential application to personal dosimetry.** Leung, H. (Toronto Univ., ON (Canada). Dept. of Chemical Engineering and Applied Chemistry); Phillips, C.R. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. RADON 222/personnel dosimetry; DAUGHTER PRODUCTS; THERMOPHORESIS

31949 (INIS-mf–13347, pp. 37-38) **Concentrations of ^{210}Pb in uranium miners' lungs and its state of equilibria with ^{238}U, ^{234}U, and ^{230}Th.** Singh, N.P.; Bennett, D.; Wrenn, M.D. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. LEAD 210/lungs; DAUGHTER PRODUCTS; INHALATION; LUNGS; MINERS; POLONIUM 210; QUANTITY RATIO; RADIATION DOSES; RADON 222; THORIUM 230; URANIUM ORES; URANIUM 234; URANIUM 238

31950 (INIS-mf–13347, pp. 38) **Pb-210 concentrations in the blood of ground workers and underground miners of zinc-lead mine.** Domanski, T. (Institute of Occupational Medicine (Poland)); Doniec, J.; Chruscielewski, W. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. BLOOD/lead 210; BLOOD; MINERS; PERSONNEL DOSIMETRY

31951 (INIS-mf–13347, pp. 39) **Uranium bearing particles in miners' and millers' lungs.** Paschoa, A.S. (Utah Univ., Salt Lake City, UT (United States)); Wrenn, M.E.; Singh, N.P.; Miller, S.C.; Jones, K.W.; Cholewa, M.; Hanson, A.L.; Saccomanno, G. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. LUNGS/uranium ores; LUNGS; MINERS; PERSONNEL DOSIMETRY

31952 (INIS-mf–13347, pp. 43) **Review of gamma and radon daughter exposures of uranium mine workers in 1982 and 1983 in terms of the present and proposed amendments to the AEC regulations.** Ching, S.H. (Atomic Energy Control Board, Ottawa, ON (Canada)); Ho, K.P. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/radiation doses; DAUGHTER PRODUCTS; DOSE LIMITS; GAMMA RADIATION; MINERS; RADON 222; URANIUM MINES

31953 (INIS-mf–13347, pp. 43-44) **A comparison of methods for monitoring miner exposure to radon decay products.** Dixon, D.W. (National Radiological Protection Board, Chilton (United Kingdom)); Miles, J.C.H; Wrixon, A.D. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. MINERS/personnel dosimetry; AIR; DAUGHTER PRODUCTS; MINERS; RADIATION DOSES; RADIATION MONITORING; RADON 222

31954 (INIS-mf–13347, pp. 44) **The establishment of a national calibration centre for practical standards for bioassay and in vivo monitoring.** Limson-Zamora, M. (Department of National Health and Welfare, Ottawa, ON (Canada). Radiation Protection Div.); Pomroy, C. Canadian Nuclear Association, Toronto, ON (Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. BIOASSAY/quality assurance; BIOASSAY; CALIBRATION; CANADA; URINE

31955 (INIS-mf–13347, pp. 45-46) **Evaluation of radiological hazards associated with mineral sandmining.** Mason, G.C. (Australian Radiation Lab., Yallambie (Australia)); Cooper, M.B.; Solomon, S.B. Canadian Nuclear Association, Toronto, ON

(Canada). 1984. 53p. (CONF-8410501–: International conference on occupational radiation safety in mining, Toronto (Canada), 14-18 Oct 1984). In *Abstracts of the International Conference on Occupational Radiation Safety in Mining.* Order Number DE92643901. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. SURFACE MINING/radiation doses; AUSTRALIA; DAUGHTER PRODUCTS; MONAZITES; RADON 220; RISK ASSESSMENT; SAND; THORIUM 232

31956 (JINR–16-90-482) **Data bank of individual dosimtry control in the JINR.** Buchnev, V.N.; Kryachko, A.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Dept. of Radiation Safety. 1990. 12p. (In Russian). Order Number DE92644156. Source: OSTI; NTIS (US Sales Only); INIS.

A data bank realises storing, updating, retrieval, statistics processing, and output to end users personal and dose information for over 2500 persons, controlled monthly or quaterly for external (beta, gamma, neutron) radiation. The basic components of the data bank are a data base (personal and dose files as current as archival) and a package of application programs for the work with the data base in the dialog mode by means of menus. The data bank was organized on the basis of the 'Pravets-16' PC with assistance of the relational DBMS dBASE3 PLUS and the Clipper compiler for the interpretive dBASEE3 programming language, working under the control DOS-16, version 3.10. 7 refs.; 8 figs.

31957 (JINR-D–19-90-457, pp. 242-261) **Effect of millimeter radiation on radiationinduced repair of genome conformation state.** Belyaev, I.Ya. (Moskovskij Inzhenerno-Fizicheskij Inst., Moscow (Russian Federation)); Alipov, E.D.; Shcheglov, V.S.; Edneral, D.I.; Lystsov, V.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. 304p. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Effect of millimeter waves on repair of genome conformation state following E.Coli cells with x-radiation was studied. From the presented data effect of microwaves on repair of genome conformation states was impossible to explain by routine thermal effects. Local transitions of DNA forms varying in spirality were shown to play certain role in efficiency of polarized electromagnetic and low dose ionizing radiation. 24 refs.; 7 figs.; 5 tabs.

31958 (JINR-D–19-90-457, pp. 236-241) **Postradiation recovery and radioresistance of seeds.** Atayan, R.R.; Semerdzhyan, S.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. 304p. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Problems on radiobiology of seeds were studied. Irradiation was shown to induce primary injuries in chromosomes sensitive to various modifying factors. Primary injuries can eliminate and form stable physico-chemical injuries as a result of physico-chemical reactions and under concomitant factors. These injuries can be reversible and nonreversible character. Reversible injuries turned out to be potential for they can be repaired at biochemical level. The cells of strong ability to repair postirradiation injuries under various equal conditions reveal a relatively high level of radioresistance. The mechanisms were shown to be basical in the observed differences of radiosensitivity of large and small seeds. 7 refs.; 3 figs.

31959 (JINR-D–19-90-457) **Genetic effects of charged particles: Proceedings of conference.** Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. 304p. (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

This volume contains the proceedings of the conference entitled Genetic Effects of Charged Particles held in Dubna, Ukrainian Soviet Socialist Republic June 1990. Selected presentations were abstracted and indexed for the database.

31960 (JINR-D–19-90-457, pp. 11-29) **Low dose radiation effects: a holistic model.** Oftedal, P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Mathematical model of low dose irradiation effects based on molecular and physiological parameters of cell response was presented. Data mainly on three aspects of the problem were used: - fact of presence of nonmonotonous discontinuous dose-effect dependences with respect to low doses was taken into consideration. Selection of such curves was based on empirical approach and needed analytical assessment; - effects of adaptive response of animal cells and induced repair systems were taken into consideration; - occurrence of optimal bioeconomical process was supposed to be a basis of effect of various background radiation on the organism. 29 refs.; 6 figs.

31961 (JINR-D–19-90-457, pp. 30-38) **Modification of γ-induced mutagenesis in Ames test-strains: 1. Radioprotector effect on mutagenesis in Salmonella typhimurium.** Basha, S.G.; Krasavin, E.A.; Kozubek, S.; Amirtaev, K.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Glycerine and cysteamine protective effect on mutagenesis was studied in 3 strains of Salmonella typhimurium under γ-radiation. Glycerine modifying effect was shown to be not similar for various test-strains and depended on DNA injury nature. DNA complex injuries were shown to play significant role in mutagenesis of TA100 and TA102 strains. Absence of cysteamine modifying effect on γ-induced mutagenesis testified to cysteamine effect on enzyme balance. 20 refs.; 2 figs.; 1 tab.

31962 (JINR-D–19-90-457, pp. 39-44) **Modification of γ-induced mutagenesis in Ames test-strains: 2. TAN effect on Salmonella typhimurium mutagenesis.** Basha, S.G.; Krasavin, E.A.; Kozubek, S.; Amirtaev, K.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Modifying affect of anoxic sensitizers on yield of γ-induced mutations was studied in prokaryotes. TAN presence considerably increased yield of induced reversions in the strains. Various degrees of modifications of γ-induced mutagenesis with TAN testified to the fact that efficiency of its interaction with DNA depended on the type of injured basis. Probably during TAN interaction with damaged guanine or cytosine more effectively modified the basis into premutation event than in case of interacting with thymine. 9 refs.; 2 figs.; 2 tabs.

31963 (JINR-D–19-90-457, pp. 45-48) **Effect of durable γ-radiation on E.Coli.** Koudela, K.; Drashil, V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Effect of prolonged low intensity γ-radiation on changes of frequency of reversion mutations was studied in Escherichia Coli. Frequency of His^+ revertants was shown to depend on growth phase. Cellular DNA absorbed more energy in stationary than DNA in growth phase. K-12 AB2497 strain of Escherichia Coli D-37 comprised about 60 Gy. This dose wasn't absorbed under continuous irradiation at dose rate of 0.21 R/min in 5 hours. The dose rate was considered to be sufficient to induce SOS-system and thus to increase mutations number. 2 refs.

31964 (JINR-D–19-90-457, pp. 49-58) **Induction of SOS-system in E.Coli under γ-irradiation in the presence of anoxic sensitizer TAN.** Komova, O.V.; Kozubek, S.; Krasavin, E.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

TAN binding with radiation-induced DNA radicals didn't result in increase of DNA single breaks. Two-fold increase of injuries yield non-modified by oxygen and repaired with the help of recA - lexA - dependent repair in case of TAN presence was revealed. The most sensitizing effect among W3110, AB2463, P3478 strains was revealed in recA - mutant. TAN minimal sensitizing effect was observed in polA - mutant. 6 refs.; 4 figs.; 2 tabs.

31965 (JINR-D–19-90-457, pp. 59-68) **Post-irradiation DNA degradation in certain repair-deficient E.Coli strains.** Bonev, M.N.; Sivriev, I.K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

To make clearer the role of the repair systems in DNA the recA, lexA, recBC$^-$ and pol4$^-$ mutant cells were subjected to γ-irradiation. It was shown that the cultivation of the cells in nutrient media after irradiation essentially alters the cell recovery. Polyfunctional nature of the RecA protein completely manifests itself and in particular as a protease cleaves sufficiently of λ-repressor in order to defy the prophafe induction. It is believed that the presence of λ-repressor in a host-cell is an additional weight on the recA - lexA - dependent repair and that the additional cleavage of the λ-repressor perturbs and restricts RecA protein to protect DNA gaps. Thus the repair capability of the cell reduces and DNA degradation increases. 24 refs.; 4 figs.; 1 tab.

31966 (JINR-D–19-90-457, pp. 68-83) **Kinetics of formation of induced mutants of Saccharomyces cerevisiae.** Chepurnoj, A.I.; Levkovich, N.V.; Mikhova-Tsenova, N.; Mel'nikova, L.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

UV and γ-radiation mutagenic effect an various strains of Saccharomyces cerevisiae was studied by analyzing formation kinetics of induced mutants at the period of postirradiation incubation. Mechanisms of induced reverse formation was suggested. The presented analysis is considered to be differential taking account of more subtle aspects of induced mutagenesis. 8 refs.; 10 figs.; 3 tabs.

31967 (JINR-D–19-90-457, pp. 104-105) **Microdosimetrical calculations of the rate of repairable DNA - double strand breaks based on a model for the interpretation of experiments with different doses and radiation qualities.** Rosemann, M.; Regel, K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

When comparing various DNA injuries induced by radiation double breaks were shown to play peculiar role in subsequent cell changes such as inactivation, aberrations, mutations and transformations. However it was proved that significant part of radiation-induced double breaks could be repaied within cell. 3 refs.

31968 (JINR-D–19-90-457, pp. 106-117) **Modifying influence of DNA synthesis inhibitors on the effect of irradiation of Chinese hamster cells.** Govorun, R.D.; Krasavin, E.A.; Lobachevskij, P.N.; Nasonova, E.A.; Pertsova, T.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

The difficulties were shown that faces when studying the effect of radiation of different quality at the chromosome level. The correct interpretation of the results is possible on considering the influence of ionizing radiations on the cell cycle characteristics. 20 refs.; 3 figs.; 3 tabs.

31969 (JINR-D–19-90-457, pp. 118-126) **Regularities of DNA synthesis repair in populations of irradiated mammalian cells.** Smirnova, S.G. (Akademiya Meditsinskikh Nauk SSSR, Obninsk (Russian Federation). Nauchno-Issledovatel'skij Inst. Meditsinskoj Radiologii); Synzynys, B.I.; Saenko, A.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Change in DNA synthesis rate in cell synchronous culture under radiation was shown to present result of summation of various processes (proper repair, cell transition from G_1 stage into synthesis stage). Experiments with cycloheximide and actinomycin D revealed that processes resulting in DNA synthesis rate increase were inducible. Supposedly DNA synthesis in the cells following irradiation differed from DNA replication in their properties in intact cells. At this stage the problem on DNA synthesis regularities remains open. 16 refs.; 4 figs.

31970 (JINR-D–19-90-457, pp. 127-134) **Comparative study of qualitative cytogenetic effects induced by fractionated γ-neutron irradiation in man lymphocytes at G_0 and G_1 stages.** Pozdyshkina, O.V. (Akademiya Meditsinskikh Nauk SSSR, Obninsk (Russian Federation). Nauchno-Issledovatel'skij Inst. Meditsinskoj Radiologii); Sevan'kaev, A.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Comparative analysis of cytogentic effects observed in case of fractionated γ-neutron irradiation of man lymphocytes of G_0 and G_1 stages within wide dose range shown: various degree of chromatin contactization in resting and proliferating cells (contactization affected the intensity of repair processes); various manifestation of injury recoveries (injuries induced by various radiations); differential division delay that was shown to depend on radiation type. Data on possible adaptive effect of first dose fraction on repeated cell irradiation were geiven. 8 refs.; 2 figs.; 1 tab.

31971 (JINR-D–19-90-457, pp. 135-139) **Radiosensitivity of L5178Y mice lymphoma cells and state of antioxidant enzyme system.** Rosek, O.; Yavorska, A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Results of experiments in which primary antioxidant enzyme LY-R and LY-S cell system were presented. It was attempted to affect radiosensitivity of the presented cells through this system. Data on correlation between cell radiosensitivity and superoxidedismutase were presented. 24 refs.; 2 tabs.

31972 (JINR-D–19-90-457, pp. 140-147) **X-radiation and hydrogen peroxide induce adaptation of lymphocytes of man peripheral blood to subsequent x-irradiation.** Bouzhik, Eh.; Rosek, O.; Voevodska, M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles:*

Proceedings of conference. 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Attention was drawn to repair induction occurring during DNA injuries and in chromatin in process of studying mechanism of lymphocyte adaptive response. Detailed study of time dependences in lymphocyte adaptive response to irradiation revealed that interval of 4 hours between adaptive and resolving irradiation was needed. Adaptive response is of essential significance for radiation risk theory. 23 refs.; 3 tabs.

31973 (JINR-D–19-90-457, pp. 148-156) **Cytogenetics of radiation-induced adaptation in man lymphocytes.** Khandogina, E.K. (Vtoroj Moskovskij Gosudarstvennyj Meditsinskij Inst., Moscow (Russian Federation)); Mutovin, G.R.; Zvereva, S.V.; Zverev, D.O.; Antipov, A.V.; Akif'ev, A.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Adaptive response of radiation-induced chromosomal aberrations in man lymphocytes cultivated with PHA was studied. Adaptive response was proposed to be regarded as one of cellular conditioned phenomena of antimutagenic after-effect. Such interpretation of adaptive response permitted to select nonroutine research particularly in cells of patients with chromosomal instability syndrome. 11 refs.; 3 figs.

31974 (JINR-D–19-90-457, pp. 199-205) **To the problem of DNA-target for radiation-induced exchange chromosomal aberrations.** Aleksandrova, M.V.; Aleksandrov, I.L. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Peculiarities of hot points distribution of structural mutagenesis were reported. The peculiarities permitted to express hypothesis in accordance with which not moderate repeats but flanking unique genes and short poly - CA/GT tracts serve as target at DNA level for primary chromosomal injuries. Identification of hot and single points of chromosomal mutagenesis, occurrense of corresponding mutants and molecular-genetic approach to determination of nature of subsequences in these points draws nearer to solving of problems of mechanisms of radiation-induced aberrations. 22 refs.; 3 figs.

31975 (JINR-D–19-90-457, pp. 157-174) **Simulation and depression of repair in mutagenesis of Drosophila: adaptive response and heavy ion effect.** Fritz-Niggli, H. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

There was shown the possibility of the enhancement of repair capacity by means of low doses. They also show the contrary, namely a possible attack of ionizing radiations on the often membrane dependent repair systems. It was shown that the membrane dependent repair system and/or energy system can be preferentially destroyed by high ZET-radiation. No differences in the sensitivity of different cell stages could be found. The effects in repair-deficient and repair-proficient cells are practically equal. 15 refs.; 14 figs.; 5 tabs.

31976 (JINR-D–19-90-457, pp. 175-187) **New type of radiation aftereffect: study of life span in generations of irradiated drosophila.** Izmajlov, D.M. (AN SSSR, Moscow (Russian Federation). Inst. Khimicheskoj Fiziki); Obukhova, L.K.; Okladnova, O.V.; Akif'ev, A.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Effect of radiation on viability of progeny of 2, 3 and more generations was studied in dynamics. Single irradiation changed rhythm of natural variations of control life span and affected viability of progeny of irradiated parents. Answer to the problem of certain generation in which differences with control were revealed, was of probable nature. Peculiarity of each repitition is unforecastable: such effects as inhibition and stimulation were observed in larly and delayed generations. Data on radiation effect can be stored for a long period of time realizing only in some postirradiation generations. 9 refs.; 4 figs.

31977 (JINR-D–19-90-457, pp. 188-198) **Photoreactivation of γ-induced premutations damages in Drosophila wild and phr$^-$ genotypes.** Aleksandrov, I.D.; Aleksandrova, M.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Modification of γ-induced point chromosomal mutations in wild (line D-32) and phr$^-$-genotype was studied. Expressed ambigyity for various genetic test-effects and dependence of its manifestation on activity of main repair cell systems functioning on the level of separate chromosomes and genome on the whole were shown to be peculiar to photoreactivation in Drosophila. 9 refs.; 2 figs.; 2 tabs.

31978 (JINR-D–19-90-457, pp. 220-229) **Modification of primary radiation injuries of biological systems by nitro compounds.** Kuropteva, Z.V. (AN SSSR, Moscow (Russian Federation). Inst. Khimicheskoj Fiziki); Shprints, Kh.; Zhumbaeva, T.T.; Kudryavtsev, M.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

The presebted results revealed that nitrocompounds decreased level of primary radiation injuries of biomacromolecules. Different mechanisms of radiosensitization with nitrocompounds were supposed to occur. A mechanism was suggested in which the main factor in radiosensitizing effect turned out to be radiation-induced formation of intermediate products of incomplete reduction of nitro group. They intensify radiation cytogentic effect on the tumor. The products were shown to occur in further reduction of anion-radical nitrocompounds in tissues under irradiation. 9 refs.; 7 figs.; 1 tab.

31979 (JINR-D–19-90-457, pp. 293-304) **Evolutionary regularities formation of hierarchic system of genome reliability.** Sarapul'tsev, B.I.; Geras'kin, S.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Radiobiological data of targest world laboratories on ratio of radiosensitivity level and genome size were analyzed in various biological objects. Evolution regularities of formation of genome reliability lhierarchy were revealed. New mechanisms of reliability enhancement were shown to occur on the basis of former ones which practically unchanged were included in hierarchy of reliability providing of genetic systems of new baryotaxone (discrete group). 16 refs.; 1 fig.; 1 tab.

31980 (JINR-D–19-90-457, pp. 230-235) **AET and MEA affect on chromosomal aberrations occurrence in root meristems under γ-irradiation of plants within wide dose range from stimulatory up to superlethal doses.** Gudkov, I.N. (Ukrainskaya Sel'skokhozyajstvennaya Akademiya, Kiev (Ukraine)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

The experiments performed within range of minimal γ-radiation doses which permit to register radiation injuries testify to the absence of antiactinic effect of aet and mea. The doses were shown to induce occurrence of chromosomal aberrations in the cells. The fact stressed the necessity of careful handlung of low dose irradiation problem and also effect stimulating growth and development. 11 refs.; 4 figs.

31981 (JINR-D–19-90-457, pp. 206-219) **Comparative aspects of carcinogenic effects caused by protons, helium ions and γ-radiation.** Fedorenko, B.S. (Ministerstvo Zdravookhraneniya SSSR, Moscow (Russian Federation)); Parfenov, Yu.D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1990. (In Russian). (CONF-9006421–: Workshop on DNA Repair on Mutagenesis Induced by Radiation, Dubna (USSR), 12-14 Jun 1990). In *Genetic effects of charged particles: Proceedings of conference.* 304p. Order Number DE93000803. Source: OSTI; NTIS (US Sales Only); INIS.

Protons, γ-radiation and helium ions affect resulted in increase of rate of neoplasms of various localization and also in widening of spectra of occurring tumors. Calculation of RBE factors revealed more carcinogenic risk of accelerated charged particles of high energy as compared to electromagnetic radiation. 11 refs.; 1 fig.; 3 tabs.

31982 (JINR-E–19-91-334) **The effect of the anoxic radiosensitizing agent Tan on induction of revertants by γ-rays and helium ions in salmonella tester strains.** Basha, S.G.; Krasavin, E.A.; Kozubek, S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 14p. Order Number DE92644015. Source: OSTI; NTIS (US Sales Only); INIS.

The modification effect of the anoxic radiosensitizer TAN on the mutagenesis in various Salmonella tester strains after γ-ray and helium ion irradiation was studied. The oxygen enhancement ratios (OER) for all 3 strains on the lethal assay after γ-irradiation is approximately equal to 2. The induction of reversions in TA98 and TA100 does not modify under anoxia. The value of OER on mutagenic assay in TA102 equals 1.6. The OER after helium ion irradiation on the lethal and mutagenic assay was less than after γ-irradiation. The mutagenesis in 3 strains after irradiation under anoxia enhances by TAN. The value of TAN modification effects after γ-irradiation increases from 2.1±0.2 for TA102 to 5±0.4 for TA100. However, TAN influence on mutagenesis in TA100 after helium ion irradiation decreases to 3.1±0.3. We conclude that peculiarities of mutagenesis in various tester strain under anoxia with TAN can be explained by considering the nature of premutational DNA damages. 23 refs.; 2 figs.; 2 tabs.

31983 (KIYaI–90-42) **The disbalance of microelements in the blood of irradiated animals and its normalization with ceruloplasmin.** AN Ukrainskoj SSR, Kiev (Ukraine). Inst. Yadernykh Issledovanij. 1991. 20p. (In Russian). Order Number DE92001409. Source: OSTI; NTIS (US Sales Only); INIS.

This volume is a collection of papers concerning the ability of ceruloplasmin to modify the effect of radiation on blood cells. Selected papers are indexed separately for the database.

31984 (KIYaI–90-42, pp. 3-9) **The disturbance of micro element exchange in different blood of animals irradiated by different radiation sources.** Antonenko, S.G.; Petrina, L.G.; Druzhina, N.A.; Serkiz, Ya.I. AN Ukrainskoj SSR, Kiev (Ukraine). Inst. Yadernykh Issledovanij. 1991. (In Russian). In *The disbalance of microelements in the blood of irradiated animals and its normalization with ceruloplasmin.* 20p. Order Number DE92001409. Source: OSTI; NTIS (US Sales Only); INIS.

The dynamics of microelements in the blood of animals irradiated by various form of radiation was investigated. It was noted that neutron irradiation causes as compared with the X-ray one, the more fast and deep disturbance of micro element content of blood plasma. (author). 4 refs.; 5 figs.

31985 (KIYaI–90-42, pp. 10-19) **The role of ceruloplasmin in rise of resistance modes of organism to different radiation.** Antonenko, S.G.; Petrina, L.G.; Druzhina, N.A.; Serkiz, Ya.I. AN Ukrainskoj SSR, Kiev (Ukraine). Inst. Yadernykh Issledovanij. 1991. (In Russian). In *The disbalance of microelements in the blood of irradiated animals and its normalization with ceruloplasmin.* 20p. Order Number DE92001409. Source: OSTI; NTIS (US Sales Only); INIS.

The influence of low doses (0.5, 1.0 Gy) of X-ray radiation on activity of ceruloplasmin, transferrin, catalases of dog's blood and the content in it of the copper, iron was studied in the dynamics of ray influence. To study the radioprotective of ceruloplasmin the influence of neutron action with dose of 2.5 Gy and X-ray radiation (5.28 Gy) on activity of ceruloplasmin in blood serum of rats and mice was investigated. (author) 11 refs.; 7 figs.; 1 tab.

31986 (NEI-DK–900) **Plan for national nuclear emergency preparedness.** Civilforsvarsstyrelsen, Birkeroed (Denmark). Jun 1992 77p. (In Danish). Order Number DE92644131. Source: OSTI; NTIS; INIS.

The responsibility for Denmark's preparedness for nuclear emergencies lies with the Ministry of the Interior and the Civil Defense administration. The latter is particularly responsible for the presented plan which clarifies the organization and the measures to be taken in order tc protect the public where, in the event of such an emergency, it could be in danger of radiation from radioactive materials. The main specifications of the plan, the activation of which covers the whole country, are that daily monitoring should be carried out so that warnings of nuclear accidents can be immediately conveyed to the relevant parties and that immediate action can be taken. These actions should result in the best possible protection against nuclear radiation so that acute and chronic damage to the health of members of the public can be restricted. The public, and relevant authorities should be informed of the situation and it should be attempted to regulate the reactions of individuals and of the society in general in such a way that damage to health, or social and economical conditions, can be restricted as much as possible. Denmark has not itself any atomic power plants, but some are located in neighbour countries and there are other sources such as nuclear research reactors, passing nuclear-driven ships etc. The detailed plan also covers possible sources of radiation, the nature of related damage to health, international cooperation, legal aspects, and a very detailed description of the overall administration and of the responsibilities of the organizations involved. (AB).

31987 (ORNL/TM–11882, pp. 1-8) **Consistency of external dosimetry in epidemiologic studies of nuclear workers.** Fix, J.J. (Pacific Northwest Lab., Richland, WA (United States)); Gilbert, E.S. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

Efforts are underway to pool data from existing epidemiologic studies of nuclear workers to obtain more precise estimates of radiation risk than would be possible from any single study. The International Agency for Research on Cancer (IARC) initiated an effort in 1989 to pool data from existing epidemiologic studies from the United States, Canada and the United Kingdom. More recently, the US Department of Energy has established the Comprehensive Epidemiologic Data Resource (CEDR), which will allow access to DOE epidemiologic research data by independent researchers. CEDR includes data on demographic variables, radiation exposure, and health effects from studies of workers at several DOE facilities. In the pooling of radiation exposure data, there is significant concern regarding consistency of personnel exposure records between the different studies. Dosimetry working groups have been formed to evaluate this issue for both the IARC and CEDR efforts. A protocol has been developed for the IARC study by representatives of the United States, United Kingdom and Canadian studies. Recently, a dosimetry working group has been formed to provide recommendations to CEDR regarding retrospective and prospective radiation dose records. Details of these efforts are addressed in this paper.

31988 (ORNL/TM–11882, pp. 81-83) **Optical study of radiation damage in A-SiO2 and problems of selective dosimetry of fast neutrons.** Abdukadyrova, I.Kh. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004–: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24

Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The present work deals with the optical study of the processes of radiation damage and structural phase transitions (PT) accumulation in α-SiO_2 monocrystals undergoing various influences of fast neutrons (F) and with the possibility of dosimetrical utilization of radiation-sensitive characteristics of the oxide. It has been found that when F grows within the limits of 10^{18}-10^{20} cm^{-2} the optical activity φ of the crystal changes; the influence of flux density, temperature, surroundings, mixed reactor irradiation components, and thickness change. The process of radiation damage of crystals by spectroscopic methods has been studied. In the course of the neutron irradiation of the α-SiO_2 structure transformation phenomena were studied by means of IR-spectrometry.

31989 (ORNL/TM-11882, pp. 99-108) **In vitro and in vivo bioassay applied to uranium trioxide.** Henge-Napoli, M.H. (IPSN/DPHD/SHI/Commissariat a l'Energie Atomique, Pierrelatte (France)); Ansoborlo, E.; Pujol, E.; Chalabreysse, J. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The aim of the present research is to suggest an in-vitro methodology, which can be used to characterize the physicochemical properties of any sample of UO3 under investigation and to validate the results by in-vivo experiments in order to categorize it within the transferability classes defined by the International Commission on Radiological Protection. Thus three in vitro tests, one chemical and two cellular, were developed to determine the solubility of uranium trioxide in various solvents or biological environments and to shed light on the dissolution mechanisms. The inhalations were performed on rats.

31990 (ORNL/TM-11882, pp. 109-116) **Experience with NQA-1 quality assurance standards applied to in vitro bioassay.** Bihl, D.E. (Pacific Northwest Lab., Richland, WA (United States)); MacLellan, J.A. Oak Ridge National Lab., TN (United States). Oct 1991. DOE Contract AC06-76RL01830. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

On June 1, 1990, the large (about 4,000 samples per year) excreta bioassay program at the Hanford Site ceased abruptly when the contract with the bioassay laboratory was terminated. An intense, high-priority effort was begun to replace the services on an interim basis until a new contract could be procured. Despite the urgency to get the excreta bioassay program going again, the Hanford Internal Dosimetry Program was constrained to use only labs that could meet stringent quality assurance (QA) requirements, even during the interim period. The QA requirements were based on NQA-1 with selected additions from the Environmental Protection Agency's QAMS 005/80 (EPA 1983) and the American Society for Testing and Materials' C 1009-83 (ASTM 1984). This constraint was driven both by legal reasons and by the Hanford Site contractors and workers not wanting the quality of the data to be sacrificed. Finding labs that could (1) handle the large throughput, (2) meet the technical requirements, and (3) pass the QA audit proved more difficult than first anticipated. This presentation focuses on the QA requirements that the labs had to meet and how those very broad requirements were applied specifically to excreta bioassay.

31991 (ORNL/TM-11882, pp. 131-140) **The radiation protection experience in KSNP of Taiwan during the past decade.** Jeng, K.T. (Taiwan Power Co., Taipei (Taiwan)). Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

This paper presents the radiation protection program in Kuosheng of Taiwan. Most doses are due to maintenance operations. The day-to-day efforts of the radiation protectors are to reduce occupational exposures for both external radiation exposure and internal contamination. Some salient works performed during the past decade by the radiation protectors are also addressed as feedback of radiation protection.

31992 (ORNL/TM-11882, pp. 141-145) **Accidental exposure with X-ray diffraction equipment.** Montanez, O. (Univ. de la Republica, Montevideo (Uruguay)); Blanco, D. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

The shutter on one of the windows of an X-ray diffraction apparatus was accidentally left open, exposing the worker to the radiation. The worker was wearing a dosimeter film, which was processed immediately to evaluate the potential risk. It was determined that the exposure rate was 350 Roentgen/minute on the skin surface, with corrections being made for the worker's thin clothing. It was concluded that in spite of the worker receiving a relative high dose, it did not reach the threshold value for producing deterministic effects such as cataracts, erythema, and skin damage.

31993 (ORNL/TM-11882, pp. 163-169) **Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32.** Miller, L.F. (Univ. of Tennessee, Knoxville (United States)); Feng, Y.; Casson, W.; Thein, M.; Mei, G. Oak Ridge National Lab., TN (United States). Oct 1991. (CONF-911004-: 3. conference on radiation protection and dosimetry, Orlando, FL (United States), 21-24 Oct 1991). In *Proceedings of the third conference on radiation protection and dosimetry.* 169p. Order Number DE92011502. Source: OSTI; NTIS.

Procedures for bioassays of ^{24}Na and ^{32}P have been developed and are suitable for determining exposure from criticality accidents to as low as approximately 5 rads with standard gamma spectroscopy and liquid scintillation equipment. Induced activities of ^{24}Na associated with much lower exposures could be identified with a low background well counter. The use of a low background liquid scintillation counter and ashing larger quantities of hair could significantly reduce the cited value for ^{32}P. Methods for calculating the dose from the activity measurements are straightforward if the spectrum is specified, and an initial estimate of the spectrum can be improved if two or more dosimeter responses are available. Comparisons of experiments and calculations illustrate that the effect of backscatter into an external dosimeter is important. In addition, these measurements indicate that the spectrum used to determine the activation of sodium should include spectral changes associated with moderation by the body. In the event of a criticality accident, results from neutron transport calculations that mock up the accident environment would probably be available within one or two days. Thus, the initial estimate obtained from direct use of the bioassay and TLD data could be refined soon after an accident.

31994 (PNL-8236) **Hanford radiological protection support services annual report for 1991.** Lyon, M.; Bihl, D.E.; Fix, J.J.; Piper, R.K.; Froelich, T.J.; Leonwich, J.A.; Lynch, T.P. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 89p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92019705. Source: OSTI; NTIS; INIS; GPO Dep.

Various Hanford sitewide radiation protection services provided by the Pacific Northwest Laboratory for the US Department of Energy, Richland Field Office and Hanford contractors are described in this annual report for calendar year 1991. These activities include internal dosimetry measurements and evaluations, in vivo measurements, external dosimetry measurements and evaluations, instrument calibration and evaluation, radiation source calibration, and radiological records keeping. For each of these activities, the routine program, program changes and enhancements, associated tasks, investigations and studies, and related publications, presentations, and other staff professional activities are discussed as applicable.

31995 (PNL-SA-20453) **The assessment of risks from exposure to low-levels of ionizing radiation.** Gilbert, E.S. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 32p.

Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920617-11: Annual meeting of the Health Physics Society, Columbus, OH (United States), 21-25 Jun 1992). Order Number DE92019076. Source: OSTI; NTIS; INIS; GPO Dep.

This report is concerned with risk assessments for human populations receiving low level radiation doses; workers routinely exposed to radiation, Japanese victims of nuclear bombs, and the general public are all considered. Topics covered include risk estimates for cancer, mortality rates, risk estimates for nuclear site workers, and dosimetry.

31996 (PNL-SA-20943) **Electron migration in 5-bromouracil-substituted DNA and oligonucleotides in irradiated aqueous solutions.** Zimbrick, J.D.; Beach, C.M.; Muciarelli, A.G.; Sisk, E.C. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206228-1: Conference on pathways to radiation damage in DNA, Rochester, MI (United States), 14-18 Jun 1992). Order Number DE92019104. Source: OSTI; NTIS; GPO Dep.

Extended abstract.

Results of work by other investigators support the hypothesis that negative charge can migrate in DNA. Charge transfer between nucleotides and electron migration in solid state DNA has been demonstrated, with migration distances as great as 110 bases. Here we report a series of studies on aqueous solutions of DNA and oligonucleotides in which the radiolysis of 5-bromouracil (BU) substituted for thymine is used as a molecular probe to detect and measure the extent of electron migration. In studies using oligonucleotides, BU was substituted for thymine at specific locations in defined base sequences using automated phosphoramidite synthesis techniques. Using these single-stranded oligonucleotides with BU located at the 5 in. end of the sequence, electrons do not appear to migrate more than one base, if any.

31997 (PNL-SA-21038) **The role of cellular and molecular studies in evaluation of health effects from combined radiation and chemical exposures.** Brooks, A.L. (Pacific Northwest Lab., Richland, WA (United States)); Gilbert, E.S.; Kitchin, R.M.; Johnson, N.F. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206229-1: 1992 conference on radiation and health, Hilton Head Island, SC (United States), 28 Jun - 2 jul 1992). Order Number DE92019086. Source: OSTI; NTIS; INIS; GPO Dep.

Additive models are currently used to predict risks following exposure to multiple agents or complex mixtures. Use of these models is questioned because different methods are used to derive risks for chemical and physical agents depending on the database used. Risks for the induction of cancer from radiation are based on large sets of human data, while standards are set for most chemical carcinogens using information derived from animal studies. However, it is not, from a scientific point of view, appropriate to add risks from physical and chemical agents to derive potential health impact from combined exposures. The range of safety factors built into the estimates, the large differences in the data sets used to evaluate and establish standards, and the differences in the basic philosophy for deriving risks for physical and chemical agents make the additive model unacceptable for estimating risks from combined exposures. To understand the potential health impacts from environmental exposure, it is important (1) to consider how risks were derived and (2) to determine if interactions exist between damage induced by the different agents to ensure that additive assumptions are valid. This presentation discusses a number of these safety factors for specific chemicals.

31998 (PNL-SA-21090) **Issues in risk assessment and modifications of the NRC health effects models.** Gilbert, E.S. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206229-2: 1992 conference on radiation and health, Hilton Head Island, SC (United States), 28 Jun - 2 jul 1992). Order Number DE92019129. Source: OSTI; NTIS; INIS; GPO Dep.

A report, Health Effects Models for Nuclear Power Plant Accident Consequence Analysis, was published by the US Nuclear Regulatory Commission, in 1985, and revised in 1989. These reports provided models for estimating health effects that would be expected to result from the radiation exposure received in a nuclear reactor accident. Separate models were given for early occurring effects, late somatic effects, and genetic effects; however, this paper addresses only late somatic effects, or the risk of cancer expected to occur in the lifetimes of exposed individuals. The 1989 revision was prepared prior to the publication of the BEIR V, 1988 UNSCEAR, and ICRP 60 reports. For this reason, an addendum was needed that would provide modified risk models that took into account these recent reports, and, more generally, any new evidence that had appeared since the 1989 publication. Of special importance was consideration of updated analyses of the Japanese A-bomb survivor study data based on revised DS86 dosimetry. The process of preparing the addendum required thorough review and evaluation of the models used by the BEIR V, UNSCEAR, and ICRP committees, and also required thorough consideration of the various decisions that must be made in any risk assessment effort. This paper emphasizes general issues and problems that arise in risk assessment, and also indicates areas where additional development and application of statistical methods may be fruitful.

31999 (PNWD-1975-HEDR) **Summary of the March 25-26, 1991 atmospheric model working meeting: Hanford Environmental Dose Reconstruction Project.** Ramsdell, J.V. Battelle Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9103253-Summ.: 1991 atmospheric model working meeting, Richland, WA (United States), 25-26 Mar 1991). Order Number DE92019950. Source: OSTI; NTIS; INIS; GPO Dep.

Atmospheric transport and diffusion calculations for the initial phase of the Hanford Environmental Dose Reconstruction (HEDR) Project were made using the MESOILT2 computer code (Ramsdell and Burk 1991). This code implemented a Lagrangian trajectory, puff dispersion model using components from other models designed primarily for regulatory applications. Uncertainty in the dispersion calculations was estimated following model calculations. The results of the atmospheric dispersion calculations were summarized in frequency distributions by location for use in preliminary dose calculations.

32000 (PNWD-1980-01-HEDR) **Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992.** Finch, S.M.; McMakin, A.H. (comps.). Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 61p. Sponsored by USDOE, Washington, DC (United States); Department of Health and Human Services, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92018914. Source: OSTI; NTIS; INIS; GPO Dep.

The objective of the Hanford Environmental Dose Reconstruction Project is to estimate the radiation doses that individuals and populations could have received from nuclear operations at Hanford since 1944. The project is being managed and conducted by the Battelle Pacific Northwest Laboratories under contract with the Centers for Disease Control. The independent Technical Steering Panel (TSP) provides technical direction. The project is divided into the following technical tasks. These tasks correspond to the path radionuclides followed, from release to impact on humans (dose estimates): source terms; environmental transport; environmental monitoring data; demography, food consumption, and agriculture; environmental pathways and dose estimates.

32001 (PNWD-1992-HEDR) **Media information review, January-June 1992: Hanford Environmental Dose Reconstruction Project.** Harvey, G.L. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE92018797. Source: OSTI; NTIS; GPO Dep.

The media information review, requested by the Communications Subcommittee of the Technical Steering Panel (TSP), provides a general indication of the media's areas of interests with regard to the Hanford Environmental Dose Reconstruction (HEDR) Project. This review briefly assesses 14 newspaper articles/advertisements collected between January and June 1992 by Battelle Pacific Northwest Laboratories (BNW). Articles that mention the project, activities closely associated with it, or members of the Panel were included in the analysis. The sources of the articles and announcements include most newspapers in the Northwest (dailies and weeklies) as collected and distributed to the US Department of Energy (DOE) and Hanford contractors by Westinghouse Hanford Company, Communications. National and international media coverage was provided during the review period by Burrelle's Press Clipping Service, New York, and A.T.P., New Jersey. The articles and advertisements represent those collected and judged applicable to issues and activities associated with the Technical Steering Panel and the Hanford Environmental dose Reconstruction Project. The collection is not considered inclusive of every written account of the subject, but as good a representative collection as reasonable. This review is unscientific and is not meant to display a technical analysis of the materials.

32002 (RFP–4590) **Using MACCS for on-site worker dose calculations.** Peterson, V.L. EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. (CONF-9208117–3: 1992 safety analysis workshop, Salt Lake City, UT (United States), 11-13 Aug 1992). Order Number DE92019359. Source: OSTI; NTIS; INIS; GPO Dep.

At the Rocky Flats Plant (RFP), many methods have been used in the past to calculate doses to persons exposed to atmospheric releases of radionuclides from postulated accidents. The EG&G Nuclear Safety Engineering standard is the MELCOR Accident Consequence Code System (MACCS), an NRC-sponsored code used for evaluating the consequences of accidents at nuclear power plants. This code was developed at the Sandia National Laboratories primarily for assessing consequences to individuals and populations outside of the plant boundaries. We are modifying MACCS for assessing consequences to on-site personnel. The modifications are being developed in sheltering, dose conversion factors, and building wake effects. The main emphasis of this report is on the sheltering modifications.

5603 Chemicals Metabolism and Toxicology

Refer also to citation(s) 31674

32003 (DOE/ER/61150–1, pp. 63) **In vivo studies of ethanol on prolactin and luteinizing hormone in rats.** Ho, C. (Veterans Administration Medical Center, Dayton, OH (United States)); Emanuele, N.V.; Kirsteins, L.; Lawrence, A.M. Massachusetts Univ. Medical Center, Worcester, MA (United States). [1991]. (CONF-9106140–: 7. international symposium on radiopharmacology, Boston, MA (United States), 3-6 Jun 1991). In *The seventh international symposium on radiopharmacology. Program and abstracts.* 102p. Order Number DE92015724. Source: OSTI; NTIS.

Alcohol is known to have profound effects on neurohormones, but only few studies reported the interaction of ethanol (ETOH) with prolactin (Prl) and luteinizing hormone (LH) in human subjects and experimental animals. The authors studied the effects of ETOH on hypothalamic and serum levels of Prl and LH in rats using radioimmunoassay techniques. In rats treated with ETOH, three subgroups were found regarding the amount of ETOH consumption: low (L) with 3.6 ml/kg/d, medium (M) 22 ml/kg/d, and high (H) 62 ml/kg/d. Hypothalamic Prl level in control was 0.88 ng/mg protein and was significantly increased in ETOH-treated groups to 1.61 (L), $P < 0.05$; 2.32 (M), $P < 0.01$; and 2.41 (H), $P < 0.001$. Hypothalamic LH level in controls was 5.5 ng/mg protein compared to 4.3 (L); 8.7 (M), $P < 0.05$; and 8.7 (H), $P < 0.05$. However, no significant difference in serum Prl and LH levels was found between control and ETOH-treated groups.

5604 Other Environmental Pollutant Effects

Refer also to citation(s) 30581, 31997

32004 (DOE/RA/50219–21-Pt.1) **Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 1, Text.** Rhodes, J.W. Southwest Research Inst., San Antonio, TX (United States). 14 Jul 1992. 169p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-80RA50219. Order Number DE92040152. Source: OSTI; NTIS; GPO Dep.

The objective of this program is to investigate behavioral and neuroendocrine effects associated with exposure to 60-Hz electric and magnetic fields, using the baboon (Papio cynocephalus). Results from this program are used to estimate consequences of human exposure to the electric and magnetic fields associated with electric power transmission. Electric and magnetic field measurements for Experiment IIIA (Confirmatory), Experiment IV and Social Behavior portion of Experiment III are presented. The systems for the production and monitoring of the fields performed satisfactorily during Experiment IIIA and during all but the last part of Experiment IV. In Experiment III, two-way repeated analyses of variance revealed statistically significant Group (Exposed and Sham Exposed) and Period (Baseline. Exposure, and Post-Exposure) main effects. Two significant Period by Group interactions were also found. Seven of the ten behavioral categories showed a main effect of Period. Two-sample t-test comparisons of the two groups for each period indicated that performance rates in two behavioral categories (Stereotypy and Posture) were significantly lower in the Exposure Group. In general, the Exposed subjects exhibited a trend of progressively lower performance rates across the three periods. Specific accomplishments reported in this document were: measurement of electric and magnetic fields for Experiments IIIA and IV, completed analysis of the Social Behavioral data from Experiment III, and a detailed discussion of statistical methods employed on the Social Behavioral portion of Experiment III, and hematology data were collected and recorded for Operant and Social Behavioral subjects for Experiment IV.

32005 (DOE/RA/50219–21-Pt.2) **Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 2, Appendices.** Rhodes, J.W. Southwest Research Inst., San Antonio, TX (United States). 14 Jul 1992. 233p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-80RA50219. Order Number DE92040153. Source: OSTI; NTIS; GPO Dep.

This volume contains detailed experimental data to accompany quarterly report, dated July 14, 1992, by this group entitled "Investigation of Effects of 60-Hz Electric Fields on Operant and Social Behavior and on the Neuroendocrine System of Nonhuman Primates." This volume is a collection of Appendices which are entitled: Appendix A- Field Mapping Data Forms, Appendix B- Exposure Area (East Side) Electric Field Data, Appendix C- Exposure Area (East Side) Magnetic Field Data, Appendix D- Sham Area (West Side) Magnetic Field Data, Appendix E- Memoranda Concerning Field Onset During Experiment IV and the Crossover Experiment, Appendix F- Exposure Area (East Side) Electric Field Data, Appendix G- Exposure Area (East Side) Magnetic Field Data, Appendix H- Sham Area (west Side) Magnetic Field Data, Appendix I- Compiled Data and Anovas for Experiment III Social Data, Appendix J -Written Comments Provided by Statistician Dr. Robert Mason, and Appendix K- Reference Text Provided by Dr. Coelho.

32006 (PNL-SA–20368) **Cellular and molecular pathways of extremely-low-frequency electromagnetic field interactions with living systems.** Tenforde, T.S. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920630–1: 1. world congress for electricity and magnetism in biology and medicine, Orlando, FL (United States), 14-29 Jun 1992). Order Number DE92019084. Source: OSTI; NTIS; GPO Dep.

There is growing evidence that environmental electric and magnetic fields in the extremely-low-frequency (ELF) band below 300 Hz can influence biological functions by mechanisms that are only poorly understood at the present time. The primary objectives of this paper are to review the physical properties of ELF fields, their interactions with living systems at the tissue, cellular, and subcellular levels, and the key role of cell membranes ;in the transduction of signals from imposed ELF fields. Topics of discussion include signal-to-noise ratios for single cells and cell aggregates, resonance phenomena involving a combination of static and ELF magnetic fields, and the possible influence of ELF fields on molecular signaling pathways that involve membrane receptors and cytoplasmic second messengers.

57 HEALTH AND SAFETY

Refer also to citation(s) 30604

32007 (EGG-M–92025) **Risk assessment technique for evaluating research laboratories.** Bolander, T.W.; Meale, B.M.; Eide, S.A. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9204176–2: 3. annual regional conference on hazardous materials and hazardous wastes, Idaho Falls, ID (United States), 7-8 Apr 1992). Order Number DE92017858. Source: OSTI; NTIS; GPO Dep.

A technique has been developed to evaluate research laboratories according to risk, where risk is defined as the product of frequency and consequence. This technique was used to evaluate several laboratories at the Idaho National Engineering Laboratory under the direction of the Department of Energy, Idaho Field Office to assist in the risk management of the Science and Technology Department laboratories. With this technique, laboratories can be compared according to risk, and management can use the results to make cost effective decisions associated with the operation of the facility.

5701 Real Accidents

Refer also to citation(s) 31867

58 GEOSCIENCES

Refer also to citation(s) 30470, 30560, 30562, 30564, 30565, 30586, 30605, 31281, 31645, 31691, 31700, 31701, 31702, 31703, 31706, 31707, 31708, 31709, 31710, 31712, 31713, 32525, 32526, 32528, 32548, 32549

32008 (DOE/ER–0557T) **Subsurface Science Program Bibliography, 1985–1992.** USDOE Office of Energy Research, Washington, DC (United States). Office of Health and Environmental Research. Aug 1992. 55p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92040642. Source: OSTI; NTIS; INIS; GPO Dep.

The Subsurface Science Program sponsors long-term basic research on (1) the fundamental physical, chemical, and biological mechanisms that control the reactivity, mobilization, stability, and transport of chemical mixtures in subsoils and ground water; (2) hydrogeology, including the hydraulic, microbiological, and geochemical properties of the vadose and saturated zones that control contaminant mobility and stability, including predictive modeling of coupled hydraulic-geochemical-microbial processes; and (3) the microbiology of deep sediments and ground water. TWs research, focused as it is on the natural subsurface environments that are most significantly affected by the more than 40 years of waste generation and disposal at DOE sites, is making important contributions to cleanup of DOE sites. Past DOE waste-disposal practices have resulted in subsurface contamination at DOE sites by unique combinations of radioactive materials and organic and inorganic chemicals (including heavy metals), which make site cleanup particularly difficult. The long- term (10- to 30-year) goal of the Subsurface Science Program is to provide a foundation of fundamental knowledge that can be used to reduce environmental risks and to provide a sound scientific basis for cost-effective cleanup strategies. The Subsurface Science Program is organized into nine interdisciplinary subprograms, or areas of basic research emphasis. The subprograms currently cover the areas of Co-Contaminant Chemistry, Colloids/Biocolloids, Multiphase Fluid Flow, Biodegradation/Microbial Physiology, Deep Microbiology, Coupled Processes, Field-Scale (Natural Heterogeneity and Scale), and Environmental Science Research Center.

32009 (ETDE/JP-mf–92562509, pp. 51-55) **Compilation of a gravity map on 1/500,000 Niigata sheet.** Komawazawa, M. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 177p. (In Japanese). In *Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluatin of Japan.* Order Number DE92562509. Source: OSTI; NTIS (US Sales Only).

Compilation and preparation of a gravity map on the area of Niigata Sheet with scale 1/500,000, approximately 36-38 degrees north latitude, and 138-141 degrees east longitude were performed. The area of compilation is about 50,000 km^2, and the gravity measurement points used for the compilation are 52,000. The existing values of gravity data are not always calculated on the system based on the Japanese gravity standard net (JGSN75). And they contain the differences with the various types of gravimeters. Considering these facts, in order to transfer the existing measurement values to absolute values of gravity, re-measurents were carried out. By using these results, a correction formula was determined, and gravity values were re-calculated. Topographic correction was made by approximating the topography with an integrated body of supposed fan-shapes under the consideration of spherical effects, and Bouguer correction was also made by the partial sphere shell with the same size of 60 km arc length as the area of topographic correction. 10 refs., 3 figs.

32010 (ETDE/JP-mf–92562517, pp. 95-102) **Analysis and evaluation of resistivity data.: MT profiling of the southerm Tohoku district.** Ogawa, Y. (Geological Survey of Japan, Tsukuba (Japan)); Takakura, S.; Murata, Y. Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

In this report, resistivity data are analyzed and evaluated through MT profiling of the southern Tohoku district. Bandai area was selected as the model area. MT traverse line is about 150km long from Niigata plain to the Pacific coast via Aizu basin, Mt. Bandai, Koriyama, and Abukuma mountains. For the MT measurements, Phoenix V5-MT system was used. In addition to the usual MT measurement of five components, reference signals of two components in the horizontal magnetic field were measured at the points 100m to 300m away from the measuring points, and processed by the remote reference. The range of measuring frequency was between 320Hz and 0.0005Hz. Consequently, was revealed a presence of low resistivity zone in the deep part of crust in the Abukuma mountains covered by granites widely having high resistivity. It was also found that the upper surface of this low resistivity zone would correspond to the distribution of Curie point depth. 4 refs., 4 figs.

32011 (GSCAN-P–86-1A) **Current research. Part A.** Geological Survey of Canada, Ottawa, ON (Canada). 1986. 454p. Order Number DE92001408. Source: OSTI; NTIS (US Sales Only); INIS.

Selected papers have been processed separately for inclusion in the database.

32012 (INIS-mf–13331) **Annual meeting of the Israel Geological Society, 1991.** Israel Geological Society, Jerusalem (Israel); Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center. 1991 13p. (CONF-9104381–: 1991 Israel Geological Society annual meeting, Akko (Israel), 22-25 Apr 1991). Order Number DE92001406. Source: OSTI; NTIS (US Sales Only); INIS.

Individual papers in scope for the database are processed separately.

32013 (INIS-mf–13333) **Annual meeting of the Israel Geological Society, 1989.** Israel Geological Society, Jerusalem (Israel); Hebrew Univ., Jerusalem (Israel). 1989 9p. (CONF-8904438–: 1989 Israel Geological Society annual meeting, Ramot (Israel), 2-5 Apr 1989). Order Number DE92001407. Source: OSTI; NTIS (US Sales Only); INIS.

Individual items in scope for the data base are processed separately.

32014 (IS-T--1553) **The origin or the Archean Jardine iron formation-hosted lode gold deposit. Montana.** Ping, Liu. Ames Lab., IA (United States). 9 Jun 1992. 114p. Sponsored by USDOE, Washington, DC (United States); Department of the Interior, Washington, DC (United States); Geological Society of America, Boulder, CO (United States); Sigma Xi, the Scientific Research Society, New Haven, CT (United States). DOE Contract W-7405-ENG-82. Grant G1184119;Grant G1194119;Grant G1104119;Grant 4491-90. Order Number DE92018806. Source: OSTI; NTIS; GPO Dep.

While there is considerable controversy concerning the origin of greenstone-hosted lode gold deposits of Archean age, there is a general consensus that these deposits are epigenetic. By contrast, iron formation-hosted lode gold deposits of Archean or Proterozoic age are considered either epigenetic or syngenetic. At least three genetic models have been proposed for these gold deposits: a syngenetic model involving simultaneous deposition of gold and the iron formation; an epigenetic model involving a later introduction of gold, arsenic, and sulfur into the iron formation; and a multistage model involving primary concentration of gold during deposition of iron formation followed by remobilization and reconcentration of gold during later events. The Jardine district is one of only three Archean lode gold districts in the United States that have reserves of greater than 300,000 ounces of gold. The other two are the South Pass-Atlantic City district, Wyoming, and the Ropes mine, Michigan. The fact that two of the three districts are in the Wyoming province suggests that the province might be an Archean gold province similar to Archean provinces in Canada. Placer gold was discovered near Jardine in 1866, and gold quartz veins were mined in the 1880's at Mineral Hill. Exploration by the Jardine Joint Venture has concentrated on the Jardine area, including Crevasse Mountain, where minor lode gold mineralization occurs in quartz-biotite schists. In order to complement previous geochemical, mineralogical, petrological and structural studies, the present study has concentrated on fluid inclusion, stable isotope, and electron microprobe studies with the intention of determining: (1) the source of the ore-forming fluids and gold, and (2) the genetic relationship between gold mineralization and iron formation, alteration and metamorphism.

32015 (PNL-SA--21206) **Noninvasive probing of the ocean surface using laser-based nonlinear optical methods.** Korenowski, G.M. (Rensselaer Polytechnic Inst., Troy, NY (United States). Dept. of Chemistry); Frysinger, G.S.; Asher, W.E. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 15p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States). DOE Contract AC06-76RL01830. Grant N0001487K0239;Grant N0001490J1537. (CONF-9206260--2: 1. thematic conference on remote sensing for marine and coastal environments, New Orleans, LA (United States), 15-17 Jun 1992). Order Number DE92019431. Source: OSTI; NTIS; GPO Dep.

The laser-based nonlinear optical methods of second-harmonic generation and sum-frequency generation have been developed to study the chemical composition and concentration of natural surfactant materials present as slicks on the ocean surface. These noninvasive second-harmonic and sum-frequency generation methods produce signals which originate from only the top few molecular layers of the ocean surface, thereby producing an accurate picture of the ocean surface condition without interference from the bulk ocean chemistry. Chemical specificity of the methods is achieved by tuning the incident laser frequency to coincide with optical absorptions in the surface absorbed materials. We show that laser-based second-order nonlinear optical processes of SHG and SFG provide highly surface selective, noninvasive, in situ probes of the ocean surface. Although only preliminary experiments are reported in this paper, the probes provide important information about the nature of surfactants at the ocean surface and their behavior in response to dynamic forces at the sea/air interface. The future of the probes lies in their further development and use as in situ interfacial spectroscopic techniques.

32016 (SAND--91-2895C-Draft) **Recent advances in methods for measuring the dynamic response of geological materials to 100 GPa.** Furnish, M.D. Sandia National Labs., Albuquerque, NM (United States). [1991]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921162-2-Draft: Hypervelocity impact symposium, Austin, TX (United States), 17-20 Nov 1992). Order Number DE92016791. Source: OSTI; NTIS; GPO Dep.

Three classes of impact techniques have been employed for measuring equation-of-state properties for rocks, rock simulants and underdense materials such as natural snow. These techniques all use velocity interferometer diagnostics. One, employing a sample-in-projectile geometry, provides high-precision Hugoniot data and continuous release trajectories for dry or water-saturated materials. The majority of the present experiments have been performed with this geometry. The second, employing a sample-in-target geometry, provides loading path and Hugoniot data as well as limited release data. Materials studied by these two techniques have included a variety of tuffs, rhyolites, carbonates, grouts and epoxy-alumina mixture. The third method is well-suited for low-impedance materials, and employs ringdown wave interactions to give release information as well as Hugoniot and reshock states. This technique has been demonstrated for natural snow and several other distended materials. Uncertainties in the results from these techniques have been estimated by analyzing the effects of errors in observables and ancillary material properties.

32017 (UCRL-CR--109636, pp. 60, Paper 5) **Active tectonics of the south Caspian basin and surrounding regions.** Priestley, K. (Univ. of Nevada, Reno (United States)); Baker, C.; Jackson, J. Lawrence Livermore National Lab., CA (United States); Nevada Univ., Reno, NV (United States). Seismological Lab. Jan 1992. In *Analysis of seismic data from Kazakhastan, USSR. Final report.* 188p. Order Number DE92009515. Source: OSTI; NTIS.

The south Caspian Basin is a relatively aseismic block within the Alpine-Himalayan Belt, which is surrounded by zones of high seismicity. The authors have determined earthquake focal mechanisms and depths from P-wave first motion and P- and SH-waveform data for 16 earthquakes in the region surrounding the south Caspian Basin and used these to investigate the active tectonics of this region. Earthquakes beneath the Talesh Mountains of NW Iran and immediately off-shore in the SW Caspian Sea have shallow thrust mechanisms. The slip vectors of these events show that the continental crust of the Azarbaijan-Talesh block is moving east relative to both central Iran and the Arabian-Eurasia collision zone in eastern Turkey, and overthrusting the 'oceanic-like' crust of the south Caspian Basin. The combined effect of the overthrusting of the south Caspian Basin by the Talesh-Alborz mountains in the south, and by the continental crust of the northern Caspian Sea in the north will lead to the eventual destruction of the south Caspian Basin and the possible formation of an intermediate depth, dipping seismic zone within the continental interior, similar to that presently observed in the Hindu Kush.

66 PHYSICS

Refer also to citation(s) 31285

6610 General Physics

Refer also to citation(s) 30926

6611 Classical and Quantum Mechanics

Refer also to citation(s) 32075, 32082, 32083

32018 (CEA-CONF--10891) **Monte Carlo simulations in theoretical physic.** Billoire, A. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Physique des Particules Elementaires. 1991. 24p. (In French). (CONF-9103255--: Symposium on Numerical Probabilities, Marseille (France), 18-22 Mar 1991). Order Number DE92566624. Source: OSTI; NTIS (US Sales Only); INIS.

After a presentation of the MONTE CARLO method principle, the method is applied, first to the critical exponents calculations in the three dimensions ISING model, and secondly to the discrete quantum chromodynamic with calculation times in function of computer power. 28 refs., 4 tabs.

32019 (CEA-CONF–10972) **Moment problem formulation of the Schroedinger equation.** Bessis, D. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service de Physique Theorique); Handy, C.R. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service de Physique Theorique. 1992. 18p. (CONF-9201113–: International Mathematical Congress on Extrapolation and Rational Approximation, Tenerife (Spain), 13-17 Jan 1992). Order Number DE93701213. Source: OSTI; NTIS (US Sales Only); INIS.

We show that it is possible to project our in an exact manner to lowest eigenstate of Schroedinger equations. Taking into account the nodeless property of the lowest eigenstate one can replace the full Schroedinger equation by a moment problem whose measure is the eigenstate itself. The infinite set of positivity inequalities linked to this moment problem provides a framework which allows to compute sequences of upper and lower bounds to the unknown eigenvalue, and eigenfunction. The effective computation is based on deep convexity properties embedded in the set of hierarchical inequalities associated to this moment problem. The convexity allows to get the bounds through linear programming. We illustrate the method with simple one dimensional problems.

32020 (GANIL-P–91-18) **Quantum tunneling in the periodically driven SU(2) model.** Arvieu, R. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires); Kaminski, P.; Ploszajczak, M. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 16p. Order Number DE92570071. Source: OSTI; NTIS (US Sales Only); INIS.

The tunneling rate is investigated in the quantum and classical limits using an exactly soluble, periodically driven SU(2) model. The tunneling rate is obtained by solving the time-dependent Schroedinger equation and projecting the exact wave-function on the space of coherent states using the Husimi distribution. The oscillatory, coherent tunneling of the wave-function between two Hartree-Fock minima is observed. The driving plays an important role increasing the tunneling rate by orders of magnitude as compared to the semiclassical results. This is due to the dominant role of excited states in the driven quantum tunneling. (author) 15 refs., 4 figs.

32021 (IC–92/127) **Differential inclusions governed by convex and nonconvex perturbation of a sweeping process.** Truong Xuan Duc Ha. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 18p. Order Number DE92644668. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper we study the differential inclusion of the form -dx/dt is an element of $N_C(t)(x(t)) + F(t,x(t))$, t is an element of [0,1] x(0) x_0 is an element of C(0), where C(t) is a nonempty weakly closed moving subset of a separable Hilbert space H and $N_C(t)$ (x) is the Clarke's normal cone of C(t) at the point x in C(t) and the perturbation F is satisfies one of the following assumptions: (i) F is a uniformly continuous on the graph of C with nonempty compact values in H, (ii) F is globally measurable, upper semicontinuous on H with nonempty convex compact values in H. (author). 21 refs.

32022 (IC–92/128) **Existence of viable solutions for nonconvex-valued differential inclusions in Banach spaces.** Truong Xuan Duc Ha. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 10p. Order Number DE92644669. Source: OSTI; NTIS (US Sales Only); INIS.

A local existence result is proved for the viability problem dx//dt is an element of F(t,x(t)), x (0) = x0,x(t) is an element of K for all t is an element of [0,a], where F(.,.) is an integrably bounded, (strongly) measurable in t, Lipschitz continuous in x multifunction with closed values and K is a closed subset of a Banach space. (author). 11 refs.

32023 (IC–92/130) **Non-commutative differential geometry: 1. Geometrical symplectic formulation of classical mechanics.** Djemai, A.E.F. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 15p. (LPTO–05/A/92.). Order Number DE92644670. Source: OSTI; NTIS (US Sales Only); INIS.

The aim of this paper is to describe classical mechanics in fiber bundle formalism. (author). 6 refs.

32024 (IPNO-TH–90-84) **Random matrix theories and chaotic dynamics.** Bohigas, O. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 116p. Order Number DE92570074. Source: OSTI; NTIS (US Sales Only); INIS.

A review of some of the main ideas, assumptions and results of the Wigner-Dyson type random matrix theories (RMT) which are relevant in the general context of 'Chaos and Quantum Physics' is presented. RMT are providing interesting and unexpected clues to connect classical dynamics with quantum phenomena. It is this aspect which will be emphasised and, concerning the main body of RMT, the author will restrict himself to a minimum. However, emphasis will be put on some generalizations of the 'canonical' random matrix ensembles that increase their flexibility, rendering the incorporation of relevant physical constraints possible. (R.P.) 112 refs., 35 figs., 5 tabs.

32025 (IPNO-TH–91-07) **Magnus approximation in the adiabatic picture.** Klarsfeld, S. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Oteo, J.A. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Jan 1991. 21p. Order Number DE92570108. Source: OSTI; NTIS (US Sales Only); INIS.

A simple approximate nonperturbative method is described for treating time-dependent problems that works well in the intermediate regime far from both the sudden and the adiabatic limits. The method consists of applying the Magnus expansion after transforming to the adiabatic basis defined by the eigenstates of the instantaneous Hamiltonian. A few exactly soluble examples are considered in order to assess the domain of validity of the approximation. (author) 32 refs., 4 figs.

32026 (IPNO-TH–91-16) **Coherent state operators and n-point invariants for $U_q(sl(2))$.** Furlan, P. (Trieste Univ. (Italy). Ist. di Fisica Teorica); Stanev, Y.S.; Todorov, I.T. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 22p. Order Number DE92570109. Source: OSTI; NTIS (US Sales Only); INIS.

A description of coherent state operators for SL(n,C)/H corresponding to the finite dimensional representations SU(n) is given. A complete set of n-point $U_q(sl(2))$ invariants are given (using a polynomial basis for the irreducible finite dimensional U_q-modules), that are regular for all non-zero values of the deformation parameter q. An integral expression for the (sesquilinear) inner product in an irreducible U_q-module is also presented. (K.A.) 22 refs.

32027 (IPNO-TH–91-17) **Semiclassical quantization of multidimensional systems.** Bogomolny, E.B. (AN SSSR, Chernogolovka (Russian Federation). Inst. Teoreticheskoj Fiziki). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Mar 1991. 112p. Order Number DE92570078. Source: OSTI; NTIS (US Sales Only); INIS.

The solution of a stationary k-dimensional Schroedinger equation $H\Psi=E\Psi$ in the semiclassical limit h → 0 is reduced to a discrete (k-1)-dimensional quantum map $\psi'=T\psi$ where the integral kernel (the matrix) T is built through classical trajectories corresponding to the classical Poincare map of the given problem. High-excited energy eigenvalues obey the quantization condition $\zeta_S(E)=0$ where the function $\zeta_S(E)=\det(1-T)$ coincides with the Selberg zeta function defined as the product over primitive periodic orbits. Different properties of the constructed Poincare map are discussed, in particular, the Riemann-Siegel relation for the dynamical zeta function. (author) 54 refs., 16 figs.

32028 (IPNO-TH–91-20) **Phase space approach to quantum dynamics.** Leboeuf, P. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Mar 1991. 20p. Order Number DE92570079. Source: OSTI; NTIS (US Sales Only); INIS.

The Schrodinger equation for the time propagation of states of a quantised two-dimensional spherical phase space is replaced by the dynamics of a system of N particles lying in phase space. This is done through factorization formulae of analytic function theory arising in coherent-state representation, the 'particles' being the zeros of the quantum state. For linear Hamiltonians, like a spin in a uniform magnetic field, the motion of the particles is classical. However, non-linear terms induce interactions between the particles. Their time propagation is studied and it is shown that, contrary to integrable systems, for chaotic maps they tend to fill, as their classical counterpart, the whole phase space. (author) 13 refs., 3 figs.

32029 (IPNO-TH--91-40) **Green function and scattering amplitudes in many dimensional space.** Fabre de la Ripelle, M. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Jun 1991. 23p. Order Number DE92570081. Source: OSTI; NTIS (US Sales Only); INIS.

Methods for solving scattering are studied in many dimensional space. Green function and scattering amplitudes are given in terms of the requested asymptotic behaviour of the wave function. The Born approximation and the optical theorem are derived in many dimensional space. Phase-shift analysis are developed for hypercentral potentials and for non-hypercentral potentials with the hyperspherical adiabatic approximation. (author) 16 refs., 3 figs.

32030 (JINR-E--2-91-97) **Relativity theory in (2+2)-space.** Strel'tsov, V.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 10p. Order Number DE92644671. Source: OSTI; NTIS (US Sales Only); INIS.

The formulation is discussed of relativity theory in noneuclidean space defined by the metric form $d\tau^2=dx^1dx^2+dx^3dx^4$. As is noted, in the particular case of (1+1) dimensions new variables $x^1=t-z$ and $x^2=t+z$ are quantities directly observed by the radar method which is used to define the concept of simultaneity and distance. The transition to them significantly simplifies (special) Lorentz transformations, the 'addition' theorem of velocities and so on. 11 refs.

32031 (JINR-E--5-91-174) **On the invariant measure for the nonlinear Schroedinger equation.** Zhidkov, P.R. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 20p. Order Number DE92644672. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Commun. Math. Phys.

The invariant measure for the nonlinear Schroedinger equation is constructed. In fact, it is assumed that the nonlinearity in the equation is semilinear. The main aim of the paper is the explanation of the Fermi - Past - Ulam phenomenon. Poincare theorem gives the answer to this question. 17 refs.

32032 (JINR-R--2-91-258) **Intermittency in the limit of a large number of correlated components.** Sisakyan, A.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Darbaidze, Ya.Z.; Merebashvili, Z.V.; Slepchenko, L.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 14p. (In Russian). Order Number DE92644676. Source: OSTI; NTIS (US Sales Only); INIS.

The phenomena of intermittency in multiple distributions is considered. It is shown that such irregularities arise naturally in the multicomponent description of correlation characteristics. 26 refs.; 2 figs.; 5 tabs.

32033 (JINR-R--4-91-127) **'Schroedinger equations' of higher (>2) order.** Zakhar'ev, B.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 15p. (In Russian). Order Number DE92644677. Source: OSTI; NTIS (US Sales Only); INIS.

Review of papers useful for understanding the ^{S}chroedinger equations of higher order· A bridge to mastering the nonlocal potentials. Different types of barriers: in coefficients at the derivatives of different order. Transformations of waves with one wave number into the waves with another wave number for fixed energy. Intensified tunnelling and violation of its symmetry. Crisis of nuclear physics? Appendix: Bessel functions J_α as bound states on the lattice α at the slope of the linear potential. 19 refs.; 6 figs.

32034 (JINR-R--4-91-254) **Algorithm for the solution of the Faddeev equation for a system of three identical spinless particles.** Belyaev, V.B. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Kochkin, O.I.; Kartavtsev, O.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 8p. (In Russian). Order Number DE92644678. Source: OSTI; NTIS (US Sales Only); INIS.

The homogeneous Faddeev equation for three identical spinless particles in numerically solved by means of Fortran program for finding the binding energy. The algorithm based on the finite-dimensional approximation of the differential operator. Estimation of errors of this method has been analyzed exactly. This task has a more methodical character, but can be applied to the solution of many specific problems of quantum mechanics for a few-body system. 14 refs.; 1 fig.; 1 tab.

32035 (JINR-R--4-91-261) **Algorithm of numerical calculations of differential Yakubovsky equations for the (1+3) scattering problem.** Belyaev, V.B. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Kochkin, V.I.; Kartavtsev, V.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 10p. (In Russian). Order Number DE92644679. Source: OSTI; NTIS (US Sales Only); INIS.

This work is the continuation of the numerical calculations of the Yakubovsky equations for the scattering problem for four spinless identical particles. More exact wave function for the bound complex of three particles is used here as distinct from the foregoing calculations. This wave function is calculated by means of FORTRAN program, which is made by the authors. The obtained scattering lengths are compared with the former calculations of the authors and with the available data. 9 refs.; 1 fig.; 1 tab.

32036 (JINR-R--11-91-100) **On a modification of a continuous analog of the Newton method.** Zhanlav, T.; Puzynin, I.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 10p. (In Russian). Order Number DE92644673. Source: OSTI; NTIS (US Sales Only); INIS.

The convergence conditions for the modification of the continuous analog of the Newton method are considered, and properties of the obtained iterative scheme are studied. A connection between the evolutionary Newtonian process and the continuous of R-process of Newton type is shown. 25 refs.

32037 (JINR-R--11-91-111) **Numerical method of solution of a boundary value problem for the coupled integro-differential equations (The Bethe-Salpeter equation).** Amirkhanov, I.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Puzynin, I.V.; Pervushin, V.N.; Zhuraev, O.M.; Sarikov, N.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 18p. (In Russian). Order Number DE93602474. Source: OSTI; NTIS (US Sales Only); INIS.

We proposed the algorithm for umerical solving a boundary value problem for two-quark bound states described by the Salpeter equation with potential $V_0r^2-\alpha_s/r$ which is coupled integro-differential equations depending on physical parameters m_0 and α_s. In this algorithm an iteration scheme of the continuous analogy of Newton's method, with corresponding choice of the iteration parameter, is realized. It is shown that using the continuation over parameter (m_0, α_s) method allows one to extend considerably a region of convergence of the iteration method. The solutions of the Salpeter equation for set of parameters m_0 and α_s are obtained, which reproduce the results are available (when $m_0=\alpha_s=0$). 17 refs.; 1 fig.; 2 tabs.

32038 (JINR-R--11-91-138) **A numerical solution of the two-center problem.** Zhanlav, T.; Pavlov, D.V.; Puzynin, I.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 16p. (In Russian). Order Number DE92644674. Source: OSTI; NTIS (US Sales Only); INIS.

Two different statements of the two-center boundary problem are suggested. The problems stated are considered as a nonlinear functional equation which is solved by the continuous analog of Newton's method, and its modification. The differential equations are approximated by the finite-difference method and the method of spline with an accuracy of the order of O(h^4), where h is the step of a uniform mesh. 26 refs.; 2 tabs.

32039 (JINR-R–17-91-271) **Generalization of Schroedinger equation to the Boltzmann phase space.** Gordelij, V.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics); Savel'ev, A.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1991. 15p. (In Russian). Order Number DE92644675. Source: OSTI; NTIS (US Sales Only); INIS.

The Schroedinger equation brought into correspondence with the hypothesis of the particle interaction with vacuum has been generalized to the six-dimensional Boltzmann phase space. The Heizenberg principle of undeterminity has been connected with the mean-square values of the particle coordinates and momentum, that allows to conserve its physical sense to avoid the extremity of its primary wording. Three equations: the homogeneous Boltzmann equation of translation in its complete form, Hamilton-Yacobi equation and Schroedinger equation corresponding to the hypothesis of particle interaction with the vacuum follow from the generalized Schroedinger equation. It was found that Green function having a coherent view in Boltzmann space is the funfamental solution of the generalized Schroedinger equation. The general view of a microscopic wave function structure for the Bose-system has been suggested. 5 refs.

32040 (LAPP-TH–350/91) **A quasi-parafermionic realization of G_2 and $U_q(G_2)$.** Frappat, L. (Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires); Sciarrino, A. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Sep 1991. 8p. Order Number DE93703833. Source: OSTI; NTIS (US Sales Only); INIS.

A construction of the exceptional Lie algebra G_2 and of the corresponding quantum algebra $U_q(G_2)$ is presented, using quasi-parafermionic creation and annihilation operators and their quantum analogue. As a by-product, a new realization of $U_q(A_2)$ is found. (author) 7 refs.

32041 (LA-UR–92-2536) **Measurement of atomic elastic constants by pulsed neutron powder diffraction.** Lawson, A.C.; Kwei, G.H.; Goldstone, J.A.; Cort, B.; Sheldon, R.I.; Foltyn, E.; Vaninetti, J.; Eash, D.T.; Martinez, R.J.; Archuleta, J.I. Los Alamos National Lab., NM (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208129–1: 41. annual Denver x-ray conference, Denver, CO (United States), Aug 1992). Order Number DE92040389. Source: OSTI; NTIS; INIS; GPO Dep.

A technique for determining the atomic elastic constants from measurements of the Debye-Waller factors has been developed. The Debye-Waller factors are obtained by Rietveld refinement of time-of- flight neutron diffraction data and interpretation in terms of an atomic Debye-Waller temperature. The method is applicable to powders and to materials that must be encapsulated for safety or environmental reasons. Illustrations of the technique with applications to actinide metals, to metallic hydrides and to high-temperature superconductors are presented. (JDB)

32042 (LBL–27862) **Quantum theory and the emergence of patterns in the universe.** Stapp, H.P. Lawrence Berkeley Lab., CA (United States). Nov 1989. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-8910575–1: Patterns in the universe: an international symposium, Washington, DC (United States), 20-22 Oct 1989). Order Number DE92017548. Source: OSTI; NTIS; INIS; GPO Dep.

The topic of this symposium is the quest to discover, define, and interpret patterns in the universe. This quest has two parts. To discover and define these patterns is the task of science: this part of the quest is producing a copious flow of reliable information. To interpret or give meaning to these patterns is the task of natural philosophy: this part has not kept pace.

32043 (LYCEN–91-21) **On quantum groups and their potential use in mathematical chemistry.** Kibler, M. (Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire); Negadi, T. Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire. Jun 1991. 16p. (CONF-9106390–: 4. International conference on mathematical and computational chemistry, Bled (Yugoslavia), 3-7 Jun 1991). Order Number DE92570096. Source: OSTI; NTIS (US Sales Only); INIS. Submitted to Journal of Mathematical Chemistry.

The quantum algebra $su_q(2)$ is introduced as a deformation of the ordinary Lie algebra su(2). This is achieved in a simple way by making use of q-bosons. In connection with the quantum algebra $su_q(2)$, the q-analogues of the harmonic oscillator and the angular momentum are discussed. The q-analogues of the hydrogen atom are also introduced by means of a q-deformation of the Pauli equations and of the so-called Kustaanheimo-Stiefel transformation. (R.P.) 17 refs.

32044 (OUP–92-18) **Maximal reductions in the Baker-Hausdorff formula.** Kolsrud, M. Oslo Univ. (Norway). Fysisk Inst. May 1992. 29p. Order Number DE93602475. Source: OSTI; NTIS; INIS.

A preliminary expression for the Baker-Hausdorff formula is found up to ninth order, i.e. a series expansion of z in terms of multiple commutators, where $e^x=e^xe^y$ with x and y non-commuting, up to ninth degree in x,y. By means of complete sets of linear relations between multiple commutators, maximal reduction of the number of different multiple commutators in the series is obtained. 4 refs.

32045 (OUP–92-24) **Quantum theory and questions of reality and completeness.** Andaas, H.E.; Gjoetterud, O.K. Oslo Univ. (Norway). Fysisk Inst. Jul 1992. 18p. Order Number DE93602476. Source: OSTI; NTIS; INIS.

The authors discuss how the description of a two-particle spin-1/2 system prepared in a singlet state, a product state of definite total spin-projection and a specified mixture relates to the EPR conceptions of reality, locality and completeness and to Jarrets interpretations and representations of these concepts by probability statements. The importance of the state-preparation procedures and their relevance in this context is emphasized. The position of Bell's inequalities is also discussed. It is concluded that the inequalities have a limited power in deciding whether or not a system requires a quantal decription and that making a priori claims on reality and completeness is a too narrow scheme to describe quantal phenomena. 22 refs. 4 figs.

32046 (OUP–92-25) **Bell-type experiments and the concept of locally stochastic causality.** Andaas, H.E. Oslo Univ. (Norway). Fysisk Inst. Aug 1992. 21p. Order Number DE93602477. Source: OSTI; NTIS; INIS.

The concept of locally stochastic causality (LSC), related to the theory of local beables suggested by Bell, is introduced. It is argued that the experiments performed to verify the predictions of Bell's inequalities have merely been tests for the possibility of a description of nature in terms of joint probability distributions for the observables and that they do not provide sufficient results to sustain claims that theories based upon LSC have been falsified. 31 refs., 5 figs.

32047 (SLAC-PUB–5733-Rev.) **Second quantization in bit-string physics: Revision.** Noyes, H.P. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9203181–1-Rev.: Workshop on harmonic oscillators, Baltimore, MD (United States), 25-28 Mar 1992). Order Number DE92019645. Source: OSTI; NTIS; INIS; GPO Dep.

Using a new fundamental theory based on bit-strings we derived a finite and discrete version of the solutions of the free one particle Dirac equation as segmented trajectories with steps of length h/mc along the forward and backward light cones executed at velocity ±c. Interpreting the statistical fluctuations which cause the bends in these segmented trajectories as emission and absorption of radiation, these solutions are analagous to a fermion propagator in a second quantized theory. This allows us to interpret the mass parameter in the step length as the physical mass of the free particle. The radiation in interaction with it has the usual harmonic oscillator structure of a second quantized theory. We sketch on these free particle masses can be generated gravitationally using the combinatorial hierarchy sequence $(3,10,137,2^{127}+136)$, and some of the predictive consequences.

6612 Techniques of General Use in Physics

Refer also to citation(s) 32189, 32377, 32392

32048 (CNIC–00400) **Study of electron-beam-pumped KrF laser kinetics and calculation of energy deposition.** Liu Hairui (Institute of Applied Physics and Computational Mathematics, Beijing, BJ (China)); Wang Zhengyan; Chen Dongquan. China Nuclear Information Centre, Beijing, BJ (China). May 1990. 7p. (In Chinese). (IAPCM–0015.). Order Number DE93602496. Source: OSTI; NTIS (US Sales Only); INIS.

The program of the electron-beam-pumped KrF laser kinetics has been developed. By using this program the relation of relaxation rate of upper laser level to the optimum output condition of the KrF laser is studied. It is expected that the laser output will be directly proportional to the relaxation rate under a given condition when the laser flux is near saturation. The numerical simulation showed that a rise (or drop) in pump rate is faster than that of the relaxation rate, the laser output rises (or drops) as well. The optimum condition of output is obtained. The pressure ($5 \approx 6$ atm*), the pump power and the Ar, Kr, F_2 mixture ratio are determined for the optimum condition. In order to study the energy deposition of the electron-beam-pumped KrF gas laser, the SANDYL and the ITS programs have been developed. The latter is the program with the axial magnetic field applied, while the former without any field. The energy depositions of two kinds of Ar/Kr/F_2 mixtures at various pressures of the electron-beam-pumped cylindrical KrF laser are calculated with the SANDYL program. The results show that under the same conditions, the energy deposition with the axial magnetic field applied is 3 times larger than that without any magnetic field. The energy depositions of two kinds of Ar/Kr/F_2.

6613 Other Aspects of Physical Science

Refer also to citation(s) 30927, 30928, 30929, 30930, 30931, 30932, 30933, 31312, 31360, 31390, 31402, 31420, 31421, 31637, 31760, 31761, 32066, 32464

32049 (CONF-9207117–1) **Effects of physical properties and geometry on shapes and stability of polarizable drops in external fields.** Wohlhuter, F.K. (Tennessee Univ., Knoxville, TN (United States). Dept. of Chemical Engineering); Basaran, O.A. Oak Ridge National Lab., TN (United States). Jul 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 6. international conference on magnetic fluids; Paris (France); 20-24 Jul 1992. Order Number DE92018865. Source: OSTI; NTIS; INIS; GPO Dep.

Equilibrium shapes and stability of linearly and nonlinearly polarizable drops floating freely between the two faces of a parallel-plate capacitor and subjected to an electric (magnetic) field are found by solving the Young-Laplace equation for surface shape and the Maxwell equations for field distribution. Accounting for nonlinear polarization at last brings theory and experiment into accord. Finite plate separation - as in any real experiment - is also found to play a big role.

32050 (DOE/ET/53088–562) **Dynamics of the ion-ion acoustic instability in the thermalization of ion beams.** Han, J.H. (Texas Univ., Austin, TX (United States). Inst. for Fusion Studies); Horton, W.; Leboeuf, J.N. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. Jul 1992. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-80ET53088. (IFSR–562). Order Number DE92019396. Source: OSTI; NTIS; INIS; GPO Dep.

Particle simulation using a nonlinear adiabatic electron response with two streaming ion species and nonlinear theory are used to study the collisionless thermalization of ion beams in a hot electron plasma. The slow beam or subsonic regime is investigated and the criterion for the transition from predominantly light ion to predominantly heavy ion heating is developed. Long-lived ion hole structures a-re observed in the final state.

32051 (JINR-R–11-91-68) **Evaluation of the high energy proton accumulation effect in the geomagnetic field by the mapping method.** Amirkhanov, I.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Zhidkov, E.P.; Il'in, I.V.; Il'in, V.D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 14p. (In Russian). Order Number DE92643959. Source: OSTI; NTIS (US Sales Only); INIS.

Some features of the behaviour of the charged particles in the geomagnetic dipole trap are investigated in the dynamical chaos. Estimates of the retention time and the albedo proton accumulation effect have been made with help of numerical experiments with the Poincare mapping. The dependence of the effects on the adiabatic parameter value is shown. 17 refs.; 9 figs.

32052 (LA-UR–92-2125) **Geostationary-satellite beacon-receiver array for studies of ionospheric irregularities.** Carlos, R.C.; Jacobson, A.R.; Wu, Guanghui. Los Alamos National Lab., NM (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207118–1: Beacon satellite symposium, Boston, MA (United States), 5-12 Jul 1992). Order Number DE92018979. Source: OSTI; NTIS; GPO Dep.

Ionospheric irregularities can be studied by various techniques. These include widely spaced Doppler sounders or ionosondes, Faraday rotation polarimetry, and two-frequency differential Doppler, and radio interferometry. With geostationary satellites, one usually uses Faraday rotation of the beacon signal to measure the ionospheric TEC. With a network of polarimeters, the horizontal wave parameters of Traveling Ionospheric Disturbances (TIDS) can be deduced, but the shortcoming of this technique is its poor sensitivity. This paper describes a geostationary-satellite beacon-receiver array at Los Alamos, New Mexico, which will be employed for the studying of ionospheric irregularities, especially the fine-scale TIDS.

32053 (LA-UR–92-2138) **Are some of the luminous high-latitude stars accretion-powered runaways?.** Leonard, P.J.T. (Los Alamos National Lab., NM (United States)); Hills, J.G.; Dewey, R.J. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9205226–3: Conference on luminous high-latitude stars, Boston, MA (United States), 28-30 May 1992). Order Number DE92018853. Source: OSTI; NTIS; INIS; GPO Dep.

It is well known that (1) runaway stars can be produced via supernova explosions in close binary systems, (2) most of such runaways should possess neutron star companions, and (3) neutron stars receive randomly oriented kicks of $\simeq 100$ to 200 km s^{-1} at birth. We find that this kick sometimes has the right amplitude and direction to make the neutron star fall into the runaway. Accretion onto a neutron star is a source of energy that is roughly an order of magnitude more mass efficient than nuclear burning. Thus, runaways containing neutron stars may live much longer than would normally be expected, which would allow them to travel great distances from their birthplaces during their lifetimes. Some of the early B-type stars far from the Galactic plane and the high-latitude F and G-type supergiants may be accretion-powered runaway stars.

32054 (LA-UR–92-2431) **The ALEXIS experiment: Current status and performance.** Bloch, J.J.; Priedhorsky, W.C.; Roussel-Dupre, D.; Edwards, B.C.; Smith, B.W. Los Alamos National Lab., NM (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-920792–18: SPIE international symposium on optical applied science and engineering, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92018601. Source: OSTI; NTIS; GPO Dep.

The Array of Low Energy X-ray Imaging Sensors (ALEXIS) experiment consists of a mini-satellite containing six wide angle EUV/ultrasoft X-ray telescopes. Its purpose is to map out the sky in three narrow (~5%) bandpasses around 66, 71, and 93 eV. The mission will be launched on the Pegasus Air Launched Vehicle in 1992 into a 400 nautical mile, high inclination orbit. The project is a collaborative effort between Los Alamos National Laboratory, Sandia National Laboratory, and the University of California-Berkeley Space Sciences Laboratory. The six telescopes are arranged in three pairs in such a manner that as the satellite spins twice a minute they scan the entire antisolar hemisphere. Each f/1 telescope consists of a spherical multilayer coated mirror with a spherical microchannel plate detector located at the prime focus and a thin aluminum or lexan/boron filter in front of the detector. The multilayer coatings determine the bandpasses of the telescopes. Each telescope has a field of view of 33 degrees. Unlike grazing incidence x-ray telescopes, the point spread function is uniform over the entire field of view with a FWHM of ~0.5 degrees determined by spherical aberration. In this paper we present the status of the project as of July 1992 as well as summary results from the pre-flight telescope calibration procedures.

32055 (LA-UR-92-2457) **Uniformity results of the multilayer mirrors used in the ALEXIS ultrasoft x-ray telescopes.** Roussel-Dupre, D.; Ameduri, F. Los Alamos National Lab., NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-920792–27: SPIE international symposium on optical applied science and engineering, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92018611. Source: OSTI; NTIS; GPO Dep.

The Array of Low Energy X-ray Imaging Sensors (ALEXIS) experiment, a mini-satellite containing six wide angle EUV/ultrasoft X-ray telescopes, is scheduled to be launched by a Pegasus rocket into a 425 nautical mile orbit in 1992 to observe cosmic X-rays. The telescopes utilize near normal incidence optics featuring a 12.8 cm diameter, 13.52 cm radius of curvature spherical mirror with a Mo/Si multilayer coating. The multilayer coatings are tuned to wavelengths of 133,171 and 186 Å. In addition, the top layers are comprised of a unique "wavetrap" designed to suppress the dominate background radiation at 304 Å from the geocorona. We present measured performance data for these mirrors including the two dimensional uniformity of the multilayer as a function of both radius and angular rotation, the measured reflectivity at the primary wavelength and the effectiveness of the "wavetrap". We also discuss problems encountered due to contamination and design changes that have been made to mitigate the effect of contamination.

32056 (LA-UR-92-2495) **Dynamical mass estimates in M13.** Leonard, P.J.T. (Los Alamos National Lab., NM (United States)); Richer, H.B.; Fahlman, G.G. Los Alamos National Lab., NM (United States). [1992]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207116–1: Conference on dynamics of globular clusters, Berkeley, CA (United States), 15-17 Jul 1992). Order Number DE92018946. Source: OSTI; NTIS; INIS; GPO Dep.

We have used the proper motion data of Cudworth Monet to make mass estimates in the globular cluster M13 by solving the spherical Jeans equation. We find a mass inside a spherical shell centered on the cluster with a radius corresponding to 390 arcsec on the sky of 5.5 or 7.6 × 10^5 M$\odot$, depending on the adopted cluster distance. This large dynamical mass estimate together with the observed fact that the mass function of M13 is rising steeply at the low-mass end suggest that much of the cluster mass may be in the form of low-mass stars and brown dwarfs.

32057 (LA-UR-92-2545) **Neutron superfluid dynamics.** Epstein, R.I. (Los Alamos National Lab., NM (United States)); Link, B.; Baym, G. Los Alamos National Lab., NM (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract W-7405-ENG-36. Grant DMR 91-22385. (CONF-9202117–4: Physics of isolated pulsars workshop, Taos, NM (United States), 23-28 Feb 1992). Order Number DE92040386. Source: OSTI; NTIS; GPO Dep.

Neutron superfluid dynamics and the coupling between the superfluid and the solid crust play important roles in the rotational, thermal and magnetic evolution of neutron stars. Here we describe the physical processes by which the neutron superfluid and the crust interact.

32058 (LA-UR-92-2547) **Ultraviolet studies of novae in the large magellanic cloud.** Starrfield, S. (Arizona State Univ., Tempe, AZ (United States). Dept. of Physics and Astronomy); Hauschildt, P.H.; Shore, S.N. Los Alamos National Lab., NM (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States); National Aeronautics and Space Administration, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206268–1: New aspects of magellanic cloud research, Heidelburg (Germany), 15-17 Jun 1992). Order Number DE92040348. Source: OSTI; NTIS; GPO Dep.

We report on the ultraviolet observations of five novae in the LMC. They are LMC1988 #1, which was a CO nova similar to OS And; LMC 1988 #2, which was an ONeMg nova similar to Nova Her 1991; LMC 1990 #1, which was a very fast ONeMg nova similar to V693 CrA 1981; LMC 1990 #2, which was a recurrent nova similar to U Sco; and LMC 1991 which reached V~9.

32059 (LA-UR-92-2548) **Nucleosynthesis in nova explosions.** Starrfield, S. (Arizona State Univ., Tempe, AZ (United States). Dept. of Physics and Astronomy); Politano, M.; Truran, J.W.; Sparks, W.M.; Nofar, I.; Shaviv, G. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206249–2: Origin & evolution of the elements conference, Paris (France), 22-25 Jun 1992). Order Number DE92040349. Source: OSTI; NTIS; GPO Dep.

This paper examines the consequences of accretion of hydrogen rich material onto ONeMg white dwarfs with masses of 1.0M$\odot$, 1.25M$\odot$, and 1.35M$\odot$. Our results demonstrate that novae produce both ^{22}Na and ^{26}Al in astrophysically interesting amounts. Hot hydrogen burning on ONeMg white dwarfs can produce as much as 2% of the ejected material as ^{26}Al and 3% as ^{22}Na. The largest amount of ^{22}Na is produced by the highest mass ONeMg white dwarfs nova systems which are predicted to be the fastest and most luminous of all types of novae. The largest amount of ^{26}Al is produced in the lowest mass white dwarfs, which according to our evolutionary calculations, should eject the largest amount of material. In support of this prediction, the observations of QU Vul, a slow ONeMg nova, indicate that it has ejected about 10^{-3}M$\odot$. However, such a large amount of ejected mass is inconsistent with a typical ONeMg white dwarf mass > 1.25M$\odot$.

32060 (LA-UR-92-2603) **^{22}Na and ^{26}Al production in nova outbursts.** Starrfield, S. (Arizona State Univ., Tempe, AZ (United States). Dept. of Physics and Astronomy); Politano, M.; Truran, J.W.; Sparks, W.M.; Nofar, I.; Shaviv, G. Los Alamos National Lab., NM (United States). [1992]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9108216–1: Advances in nuclear synthesis, Pasadena, CA (United States), 12-15 Aug 1991). Order Number DE92040344. Source: OSTI; NTIS; GPO Dep.

This paper examines the consequences of accretion of hydrogen rich material onto ONeMg white dwarfs with masses of 1.0M$_{\odot}$, 1.25M$_{\odot}$, and 1.35M$_{\odot}$. Our results demonstrate that novae produce both ^{22}Na and ^{26}Al in astrophysically interesting amounts. Hot hydrogen burning on ONeMg white dwarfs can produce as much as 2% of the ejected material as ^{26}Al and 3% as ^{22}Na. The largest amount of ^{22}Na is produced by the highest mass ONeMg white dwarfs nova systems which are predicted to be the fastest and most luminous of all types of novae. The largest amount of ^{26}Al is produced in the lowest mass white dwarfs, which according to our evolutionary calculations, should eject the largest amount of material. In support of this prediction, the observations of QU Vul, a slow ONeMg nova, indicate that it has ejected about 10^{-3}M$_{\odot}$. However, such a large amount of ejected mass is inconsistent with a typical ONeMg white dwarf mass > 1.25MG$_{\odot}$.

32061 (SAND-92-1501C) **Eddy current power dissipation at sharp corners.** Warne, L.K. Sandia National Labs., Albuquerque, NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9208116–1: Union Radio Science International (URSI) electromagnetic theory symposium, Sydney (Australia), 17 Aug 1992). Order Number DE92016890. Source: OSTI; NTIS; GPO Dep.

This paper develops corrections to the impedance per unit length when the conductor cross section includes sharp corners. The case of a right internal angle is treated in detail. Corrections are given for all values of the ratio of internal to external magnetic permeabilities. Both the real and imaginary parts of the corrections are determined. Application of the results to a conductor of square cross section is given. Higher order terms are developed and compared to a numerical solution.

32062 (SAND–92-8491) **Nonlinear stability of combustion-driven acoustic oscillations in resonance tubes.** Margolis, S.B. Sandia National Labs., Livermore, CA (United States). [1992]. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DR00789. (CONF-921143–1: American Physical Society (APS) Division of Fluid Dynamics annual meeting, Tallahassee, FL (United States), 23-25 Nov 1992). Order Number DE92012153. Source: OSTI; NTIS; GPO Dep.

The leading-order fluid motions and frequencies in resonance tubes coupled to a combustion-driven flow source, such as occurs in various types of pulse combustors, are usually strongly related to those predicted by linear acoustics. However, in order to determine the amplitudes of the infinite number of classical acoustic modes predicted by linear theory along, and hence the complete solution, a nonlinear analysis is required. In the present work, we adopt a formal perturbation approach based on the smallness of the mean-flow Mach number which, as a consequence of solvability conditions at higher orders in the analysis, results in an infinately-coupled system of nonlinear evolution equations for the amplitudes of the linear acoustic modes. An analysis of these amplitude equations then shows that the combination of inertial processes that supply energy to the acoustic oscillations and those, such as viscosity, that dampen such motions, in conjunction with the manner in which the resonance tube is coupled to its flow source, provides an effective mode-selection mechanism that inhibits the growth of all but a few of the lower-frequency modes. For the common case of long resonance tubes, the lowest frequencies correspond to purely longitudinal modes, and we analyze in detail the solution behavior for a typical situation in which only the first of these has a positive linear growth rate. Basic truncation strategies for the infinitely-coupled amplitudes are discussed, and we demonstrate, based on analyses with both two and three modes, the stable bifurcation of an acoustic oscillation, or limit cycle, at a critical value of an appropriate bifurcation parameter. In addition, we show that the bifurcated solution branch has a turning point at a second critical value of the bifurcation parameter beyond which no stable bounded solutions exist.

32063 (TRITA-EPP–91-05) **Manifestations of electric currents in interstellar molecular clouds.** Carlqvist, P.; Gahm, G.F. Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics. Dec 1991. 20p. Order Number DE92643960. Source: OSTI; NTIS; INIS.

We draw the attention to filamentary structures in molecular clouds and point out the existence of subfilaments of sinusoidal shape and also of helix-like structures. For two dark clouds, the Lynds 204 complex and the Sandqvist 187-188 complex (The Norma 'sword') we make a detailed study of such shapes and in addition we find the possible existence of helices wound around the main filaments. All these features are highly reminiscent of morphologies encountered in solar ascending prominences and in experiments in plasma physics and suggest the existence of electric currents and magnetic fields in these clouds. On the basis of a generalization of the Bennett pinch model, we derive the magnitudes of the currents expected to flow in the filaments. Values of column densities, magnetic field strengths, and direction of the fields are derived from observations. Magnetic fields with both toroidal and axial components are considered. This study shows that axial currents of the order of a few times 10^{13}A are necessary for the clouds to be in equilibrium. The corresponding mean current densities are very small and even at the very low values of the fractional abundance of electrons encountered in these clouds, the mean electron velocities are of the order of 10^{-2}-10^{-5}m s^{-1}, much lower than the thermal velocities in the clouds. We suggest that helical structures may evolve as a result of various instabilities in the pinched clouds. We also call the attention to the kink intability in connection with the sinusoidal shapes. The existence of electromagnetically controlled features in the interstellar clouds can be tested by further observations. (au).

32064 (UCRL-JC–109552) **High frame-rate, large field wavefront sensor.** Avicola, K. (Lawrence Livermore National Lab., CA (United States)); Salmon, J.T.; Brase, J.; Waltjen, K.; Presta, R.; Balch, K.S. Lawrence Livermore National Lab., CA (United States). Mar 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9203139–2: Laser guide star adaptive optics workshop, Albuquerque, NM (United States), 10-12 Mar 1992). Order Number DE92019547. Source: OSTI; NTIS; GPO Dep.

A two-stage intensified 192 x 239 pixel imager developed by Eastman Kodak for motion analysis was used to construct a 1 kHz frame-rate Hartmann wavefront sensor. The sensor uses a monolithic array of lenslets with a focal length that is adjusted by an index fluid between the convex surface and an optical flat. The accuracy of the calculated centroid position, which is related to wavefront measurement accuracy, was obtained as a function of spot power and spot size. The sensor was then dynamically tested at a 1 kHz frame-rate with a 9 x 9 lenslet array and a fast steering mirror, which swept a plane wavefront across the wavefront sensor. An 8 cm diameter subaperture will provide a return signal (589 nm) level of about 1000 photons/ms using the AVLIS 1 kW laser (stretched pulse) as guide star source, which is sufficient to yield a wavefront measurement of better than γ/10 rms. If an area of 6 x 6 pixels per Hartmann spot were allocated, this wavefront sensor could support a 32 x 32, or 1024, element deformable mirror.

32065 (UCRL-MA–104861-Ver.2-3) **Temporal scattering and response software users' manual: Version 2.3.** McLeod, R.R. Lawrence Livermore National Lab., CA (United States). Jun 1992. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92040934. Source: OSTI; NTIS; GPO Dep.

This manual gives complete information on how to use the TSAR electromagnetic analysis software. Included are descriptions of input files, the details of how these files affect the problem, and output data specifications. What is not included is the theory of the finite-difference time-domain (FDTD) algorithm or details of the TSAR implementation of it. This manual assumes that readers are sufficiently familiar with FDTD that they only need the "how to" knowledge presented here. This is a reference manual rather than a tutorial manual. To help new users become familiar with the TSAR software, a set of example problems is included with the TSAR distribution.

6620 Physics of Elementary Particles and Fields

Refer also to citation(s) 31444, 32209

32066 (DOE/ER/40231–T12) **Research program in elementary particle physics, Task A; Outstanding Junior Investigator Program, Task B: Final report, July 1, 1985–December 31, 1991 and Final report, July 1, 1987–December 31, 1991.** Balachandran; Rosenzweig; Schechter; Wali; Bowick, M. Syracuse Univ., NY (United States). [1991]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER40231. Order Number DE92018550. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. ELEMENTARY PARTICLES/research programs; PROGRESS REPORT; STRING MODELS; TOPOLOGY; HIGH-TC SUPERCONDUCTORS; QUANTUM CHROMODYNAMICS; SU GROUPS

32067 (DOE/ER/40315–195) **Experimental Medium Energy Physics: Annual progress report, June 1991–May 1992.** Carnegie-Mellon Univ., Pittsburgh, PA (United States). [1992]. 110p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER40315. Order Number DE92040008. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics: Search for the H Dibaryon at the AGS; hypernuclear weak decay studies at the LAGS; search for strangelets using the 2 GeV/c beam line; experiment to detect double lambda hypernuclei; hyperon photoproduction at CEBAF; the region 1 drift chambers for the CLAS spectrometer; parity violating electron scattering from the proton: the G^0experiment at CEBAF; and relativistic heavy ion - nucleus collisions at the SPS.

32068 (DOE/ER/40605–2) **[Elementary particle physics research]: Final report, [1 January 1991–31 January 1992].** Rutherfoord, J. Arizona Univ., Tucson, AZ (United States). 1 Apr 1992. 57p. Sponsored by USDOE, Washington, DC (United

States). DOE Contract AC02-91ER40605. Order Number DE92019746. Source: OSTI; NTIS; INIS; GPO Dep.

This summary of our activities supported by our DOE contract DE-SC02-91ER40605 covers the period from 1 January to 31 January 1992. The major areas which consumed most of our time are D0 at the Fermilab collider, E800 at the Fermilab fixed target facility and SSC work on major detectors and in detector R&D. The research in these areas is discussed in this report.

32069 (DOE/ER/40661-3) **Indiana University High Energy Physics Group, Task C: Technical progress report, January 1, 1992–October 31, 1992.** Bower, C.; Heinz, R.; Mufson, S.; Musser, J. Indiana Univ., Bloomington, IN (United States). Dept. of Physics. 24 Apr 1992. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER40661. Order Number DE92040458. Source: OSTI; NTIS; INIS; GPO Dep.

We are participating in the experiments GEM at the SSC and MACRO at the Gran Sasso. After introducing GEM in chapter II, we present some results from GEM work we have done during the current contract period. Other significant GEM activities by our group such as participation in the evolution of GEM (as founding fathers), GEM proposal writing, and the design of GEM electronics for the Interpolating Pad Chambers for the Central Tracker are not included in this report.In chapter III we introduce MACRO and give a brief status report. Instead of a survey of our many ongoing contributions to MACRO, we choose in this technical report to concentrate on reporting results of some MACRO data analysis headed by our group (with important contributions by our collaborators, of course). This analysis, in chapter IV, concerns Point Sources.

6621 General Theory of Particles and Fields

Refer also to citation(s) 32021, 32022, 32169, 32255

32070 (CEA-CONF-10841) **Quantum fields at finite temperature and density.** Blaizot, J.P. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Sciences de la Matiere. 1991. 56p. (CONF-9107236-: 4. Symposium on Nuclear Physics High Density and High Temperature Physics, Namwon (Korea, Republic of), 1-5 Jul 1991). Order Number DE92566702. Source: OSTI; NTIS (US Sales Only); INIS.

These lectures are an elementary introduction to standard many-body techniques applied to the study of quantum fields at finite temperature and density: perturbative expansion, linear response theory, quasiparticles and their interactions, etc... We emphasize the usefulness of the imaginary time formalism in a wide class of problems, as opposed to many recent approaches based on real time. Properties of elementary excitations in an ultrarelativistic plasma at high temperature or chemical potential are discussed, and recent progresses in the study of the quark-gluon plasma are briefly reviewed.

32071 (CRN-HE-90-04) **Twisted WZW superstring solutions.** Traubenberg, M.R. de; Savoy, C.A. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1990. 24p. Order Number DE93703447. Source: OSTI; NTIS (US Sales Only); INIS.

Superstring solutions on twisted group manifolds are investigated chiefly in the case of fermionizable Wess-Zumino-Witten models that yield space-time N=1 supersymmetry. Both outer and inner automorphisms are admitted as boundary conditions. The representations of the twisted current algebras are studied and their mass spectra perfectly match with their fermionic realizations. The supersymmetric solutions are characterized and classified. Especial ones are identified with Z_4 and Z_3 orbifolds via the equality of the fermion equivalences. (author) 20 refs., 2 tabs.

32072 (CRN-PHTH-91-16) **Variational principle in stochastic quantization and 1/N expansion.** Grandati, Y. (Metz Univ., 57 (France)); Berard, A.; Grange, P. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1991. 13p. Order Number DE92570100. Source: OSTI; NTIS (US Sales Only); INIS.

In stochastic quantization of O(N) scalar field theories, the variational scheme of Amundsen and Damgaard is analysed in the framework of a 1/N expansion. In the large-N limit the usual saddle point result is retrieved. Successive corrections in 1/N to the trial field are obtained analytically in a simple iterative process, with improved minimization at each step. A solvable toy model is treated explicitly showing very rapid convergence even for N = 3. For the O(N) ϕ^4 theory a minimization order by order in 1/N is shown to be the only feasible one in practice. (author) 11 refs., 2 figs.

32073 (DOE/ER/25065-3) **[Mathematics and string theory]: [Annual progress report].** Harvard Univ., Cambridge, MA (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER25065. Order Number DE92019292. Source: OSTI; NTIS; GPO Dep.

Over the past year our research activities concentrated around: (1) non-commutative differential geometry and its connections with quantum physics and (2) 2-dimensional(super) conformal quantum field theories and related non-linear σ-models. This paper discusses these topics.

32074 (IC-92/95) **A theoretical kinematical study of the gradient of any cosmic scalar field.** Melek, M. International Centre for Theoretical Physics, Trieste (Italy). Jun 1992. 5p. Order Number DE92644731. Source: OSTI; NTIS (US Sales Only); INIS.

Attention is called to a simple theoretical kinematical study of the gradient of any cosmic scalar field in the universe, which might be used for an alternative interpretation for the very recent results obtained by COBE regarding the matter density gradient and in turn the temperature gradient in the universe. (author). 10 refs.

32075 (IC-92/105) **A remark on the unitary part of contractions.** Duggal, B.P. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 3p. Order Number DE92644713. Source: OSTI; NTIS (US Sales Only); INIS.

Considering operators on a complex infinite dimensional Hilbert space H and denoting by T* a construction with $C_{.0}$ completely non-unitary part, it is proved that A_T is projection which commutes with T and $H^{(u)}{}_T = A_T H$. 3 refs.

32076 (IC-92/122) **Nonlinear realisations of $\omega_{1+\infty}$.** Sezgin, E. (International Centre for Theoretical Physics, Trieste (Italy)); Stelle, K.S. International Centre for Theoretical Physics, Trieste (Italy). Jun 1992. 20p. (Imperial/TP-90-91/21;CTP-TAMU-26/91.). Order Number DE92644721. Source: OSTI; NTIS (US Sales Only); INIS.

The nonlinear scalar-field realisation of $\omega_{1+\infty}$ symmetry in d = 2 dimensions is studied in analogy to the nonlinear realisation of d = 4 conformal symmetry SO(4,2). The $\omega_{1+\infty}$ realisation is derived from a coset-space construction in which the divisor group is generated by the non-negative modes of the Virasoro algebra, with subsequent application of an infinite set of covariant constraints. The initial doubly-infinite set of Goldstone fields arising in this construction is reduced by the covariant constraints to a singly-infinite set corresponding to the Cartan-subalgebra generators $v^{l}{}_{-(l+1)}$. We derive the transformation rules of this surviving set of fields, finding a triangular structure in which fields transform into themselves or into lower members of the set only. This triangular structure gives rise to finite-component subrealisations, including the standard one for a single scalar. We derive the Maurer-Cartan form and discuss the construction of invariant actions. (author). 12 refs, 3 figs.

32077 (IC-92/124) **Fourth-rank gravity and cosmology.** Marrakchi, A.L.; Tapia, V. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 40p. Order Number DE92644722. Source: OSTI; NTIS (US Sales Only); INIS.

We consider the consequences of describing the metric properties of space-time through a quartic line element. The associated "metric" is a fourth-rank tensor $G_{\mu\upsilon\lambda\pi}$. In order to recover a Riemannian behaviour of the geometry it is necessary to have $G_{\mu\upsilon\lambda\pi} = g_{(\mu\upsilon}g_{\lambda\pi)}$. We construct a theory for the gravitational field based on the fourth-rank metric $G_{\mu\upsilon\lambda\pi}$. In the absence of matter the fourth-rank metric becomes separable and the theory coincides with General Relativity. In the presence of matter we can maintain Riemmanianicity, but now gravitation couples, as compared to General Relativity, in a different way to matter. We develop a simple cosmological model based on a FRW metric with matter described by a perfect fluid. For the present time the field equations are compatible with $k_{OBS} = O$ and $\Omega_{OBS} < 0.18$ and they imply $p/\rho < 0.038$ which corresponds to an almost pressureless perfect fluid. Therefore, the flatness problem is solved. However, our approach is valid only for $p/\rho<0.236$. Therefore, we consider an early universe in which the state equation of matter is $p/\rho=0.236$ rather than $p/p=1/3$. There is no violation of causality, no horizon problem, for $t>t_{CLAS}$ approx. $10^{20}t_{PLANCK}$ approx. 10^{-23}s. Our final and most important result is the fact that the entropy is an increasing function of time. When interpreted at the light of General Relativity the treatment is shown to be almost equivalent to that of the standard model of cosmology combined with the inflationary scenario. (author). 16 refs, 1 fig.

32078 (IC–92/126) **Beltrami parametrization and gauging of Virasoro and w-infinity algebras.** Tatar, L. (Cluj Univ., Cluj-Napoca (Romania). Dept. of Theoretical Physics). International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 20p. Order Number DE92644844. Source: OSTI; NTIS (US Sales Only); INIS.

The gauging of the Virasoro and w-infinity algebras are discussed from the point of view of BRST symmetry. Both algebras are realised as "Russian formulas" for the curvatures built from the generators of the Lie algebras and the corresponding gauge fields. The generalized curvatures are used to determine the gauge invariant Lagrangians as well as the anomaly structures of the conformal two dimensional theory and the w-gravity. (author). 21 refs.

32079 (IC–92/129) **Time-translation noninvariance of temporal gauge propagator.** Lim, S.C. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 12p. Order Number DE92644723. Source: OSTI; NTIS (US Sales Only); INIS.

We show that within the framework of stochastic mechanics, the quantization of a free electromagnetic or Yang-Mills field in the temporal gauge can be consistently carried out. The resulting longitudinal component of the photon or gluon propagator is time-translation noninvariant. The exact form of the propagator depends on the additional boundary condition which fully fixes the temporal gauge. (author). 11 refs.

32080 (IC–92/131) **Compensating fields and anomalies in supergravity.** Shamir, Y. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 24p. Order Number DE92644724. Source: OSTI; NTIS (US Sales Only); INIS.

We discuss the quantization of theories which are formulated using compensating fields. In particular, we discuss the relation between the components formulation and the superspace formulation of supergravity theories. The requirement that the compensating field can be eliminated at the quantum level gives rise to on-shell constraints on the operators of the theory. In some cases, the constraints turn out to be physically unacceptable. Using these considerations we show that new minimal supergravity is in general anomalous. (author). 17 refs.

32081 (IC–92/132) **General scalar-tensor theories for induced gravity inflation.** Boutaleb J, H. (Faculte des Sciences, Rabat (Morocco). Lab. de Physique Theorique); Marrakchi, A.L. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 17p. Order Number DE93602505. Source: OSTI; NTIS (US Sales Only); INIS.

Some cosmological implications of a general scalar-tensor theory for induced gravity are discussed. The model exhibits a slow-rolling phase provided that the coupling function $\epsilon(\phi)$ varies slowly enough such that $\phi\, d\ln\epsilon(\phi)/d\phi$ much less than 2 during almost the inflationary epoch. It is then shown that, as in the ordinary induced gravity inflation, the chaotic scenario is more natural than the new scenario which proves to be even not self-consistent. The results are applied, for illustration, to a scalar-tensor theory of the Barker type. (author). 25 refs.

32082 (IC–92/133) **Nth roots of normal contractions.** Duggal, B.P. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 14p. Order Number DE92644725. Source: OSTI; NTIS (US Sales Only); INIS.

Given a complex separable Hilbert space H and a contraction A on H such that A^n, $n\geq 2$ some integer, is normal it is shown that if the defect operator $\bar{D}_A = (1 - A^*A)^{1/2}$ is of the Hilbert-Schmidt class, then A is similar to a normal contraction, either A or A^2 is normal, and if A^2 is normal (but A is not) then there is a normal contraction N and a positive definite contraction P of trace class such that parallel to A - N parallel to 1 = 1/2 parallel to P + P parallel to 1 (where parallel to · parallel to 1 denotes the trace norm). If T is a compact contraction such that its characteristics function admits a scalar factor, if $T = A^n$ for some integer $n\geq 2$ and contraction A with simple eigen-values, and if both T and A satisfy a "reductive property", then A is a compact normal contraction. (author). 16 refs.

32083 (IC–92/134) **Topological properties of the solution sets to differential inclusions of evolution type.** De Blasi, F.S. (Roma Univ. II. Rome (Italy). Dipt. di Matematica); Pianigiani, G.; Staicu, V. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 14p. Order Number DE92644714. Source: OSTI; NTIS (US Sales Only); INIS.

Considering the Cauchy problem with a closed valued Lipschitzean multifunction, the topological properties of solution sets to differential inclusions are studied. 18 refs.

32084 (IC–92/135) **On one-dimensional topological and conformal field theories.** Bulgadaev, S.A. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 11p. Order Number DE92644726. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown how starting from one-dimensional topological field theory on Schwarz type with holomorphic differential l-form and using Hilbert reduction one can construct one-dimensional conformal free scalar theory, which can realize infinite-dimensional conformal symmetries of $W_{1+\infty}$ type as well as sl(2) Kac-Moody algebra. (author). 15 refs.

32085 (IC–92/138) **Quantum group generalization of the heterotic QFT.** Matheus Valle, J.L. (International Centre for Theoretical Physics, Trieste (Italy)); Monteiro, M.A.R. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 13p. Order Number DE92644727. Source: OSTI; NTIS (US Sales Only); INIS.

By the use of the generalized Grassmann algebra provided by Quantum Groups we introduce a new class of fields in two dimensions which have deformed commutation relations. We give the action involving this new class of fields and a bosonic scalar field and show that this action has a symmetry that resembles supersymmetry. We also construct the path-integral formalism for this new class of fields and compute the propagator for them in the context of the q-heterotic model. (author). 11 refs.

32086 (IC–92/140) **Normal equivariant forms of vector fields.** Sanchez Bringas, F. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 6p. (In French). Order Number DE92644845. Source: OSTI; NTIS (US Sales Only); INIS.

We prove a theorem of linearization of type Siegel and a theorem of normal forms of type Poincare-Dulac for germs of holomorphic vector fields in the origin of C^2, Γ -equivariants, where Γ is a finite subgroup of GL (2,C). (author). 5 refs.

32087 (IC–92/141) **More on the radiation reaction and runaway solutions in classical electrodynamics.** Barut, A.O. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 4p. Order Number DE92644715. Source: OSTI; NTIS (US Sales Only); INIS.

The Lorentz-Dirac equation should be changed by implementing the conditions that (1) when external force is absent, it reduces to $d\,(dx/dt)/dt = 0$, and (2) the acceleration cannot reach infinity otherwise there would be an extra term in the equation itself and the equation breaks down. (author). 4 refs.

32088 (IC–92/144) **Chiral Schwinger model at finite temperature.** Boschi Filho, H. (International Centre for Theoretical Physics, Trieste (Italy)); Natividade, C.P. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 9p. Order Number DE92644728. Source: OSTI; NTIS (US Sales Only); INIS.

We discuss the chiral Schwinger model at finite temperature using Fujikawa's method. We solve this model exactly and show that the axial anomaly and the dynamically generated mass for the gauge field are temperature independent. (author). 20 refs.

32089 (IC–92/145) **Remarks on the additional symmetries and W-constraints in the generalized KdV hierarchy.** Panda, S.; Roy, S. International Centre for Theoretical Physics, Trieste (Italy).

Jul 1992. 10p. Order Number DE92644729. Source: OSTI; NTIS (US Sales Only); INIS.

Additional symmetries of the p-reduced KP hierarchy are generated by the Lax operator L and another operator M, satisfying res($M^n L^{m+n/p}$) = 0 for 1 $\leq n \leq p - 1$ and m $\geq$ -1 with the condition that $\gamma L/\gamma t_{kp}$ = 0,k = 1,2,.... We show explicitly that the generators of these additional symmetries satisfy a closed and consistent W-algebra only when we impose the extra condition that $\gamma M/\gamma t_{k}$ = 0. (author). 32 refs.

32090 (IC–92/149) **Abelian gauge theories on homogeneous spaces.** Vassilevich, D.V. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 9p. Order Number DE92644730. Source: OSTI; NTIS (US Sales Only); INIS.

An algebraic technique of separation of gauge modes in Abelian gauge theories on homogeneous spaces is proposed. An effective potential for the Maxwell-Chern-Simons theory on S^3 is calculated. A generalization of the Chern-Simons action is suggested and analysed with the example of SU(3)/U(1) x U(1). (author). 11 refs.

32091 (IFVE-OMVT–90-80) **Scattering problem with complex potential as a problem with zero boundary values and its solution with finite element method.** Gusev, V.V.; Puzynin, V.I. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1990. 8p. (In Russian). Order Number DE92644869. Source: OSTI; NTIS (US Sales Only); INIS.

Numerical method is presented for solving the scattering problem for the radial Schroedinger equation with complex potential based on its representation as a linear problem with zero boundary values. The latter is approximated by the finite elements method. The results of numerical computations are presented for different potentials and compared with other analogous results. 8 refs.; 2 tabs.

32092 (IHEP-OTF–90-90) **Does the quantization of a particle with curvature lead to the Dirac equation.** Plyushchay, M.S. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1990. 11p. Order Number DE92644732. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Phys. Lett., B.

A model of a relativistic point particle whose Lagrangian has an arbitrary dependence on the curvature of its world trajectory, is studied. The mass-shell condition is extracted from the Hamiltonian constraints of the system. It is shown, that in the sector with positive squared mass in the quantum physical spectrum there are states with integer spins only. 19 refs.

32093 (INIS-mf–14069, pp. 147-151) **Scale and chiral symmetry breaking at finite density in the NJL model.** Kusaka, K. (Inst. of Theoretical Physics, Univ. Regensburg (Germany)); Weise, W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. QUARK MODEL/symmetry breaking; CHIRAL SYMMETRY; QUANTUM CHROMODYNAMICS; QUARKS; GLUONS; GLUEBALLS; QUARK MATTER; SCALAR MESONS; DENSITY; REST MASS

32094 (INIS-mf–14069, pp. 152-157) **Chiral symmetry in particle physics and its manifest realization in terms of parity doublets.** Kirchbach, M. (Inst. fuer Kernphysik, TH Darmstadt (Germany)); Beck, F.; Davidson, N.J.; Miller, H.G.; Quick, R.M. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We analyse the kind of realization of chiral symmetry in the excitation spectrum of non-strange bayons and discuss the phase transition to the region of parity duplicated resonances. (orig.).

32095 (INIS-mf–14069, pp. 284-289) **Fragmentation in the string-flux tube model.** Sailer, K. (Inst. for Theoretical Physics, Kossuth Lajos Univ., Debrecen (Hungary)); Schaefer, A.; Greiner, W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. PARTICLE PRODUCTION/string models; GLUONS; QUARK-ANTIQUARK INTERACTIONS; QUARKS; HADRONS; ELECTRON-POSITRON INTERACTIONS; PARTICLE DECAY

32096 (INP-MSU–90-56-202) **General results for massive N-point Feynman diagram with different masses.** Davydychev, A.I. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1990. 24p. (NIIYaF-MGU–90-56-202.). Order Number DE92644716. Source: OSTI; NTIS (US Sales Only); INIS.

General expressions are obtained for scalar one-loop massive Feynman diagrams with any number of external lines and with arbitrary momenta of these lines, with arbitrary values of masses and powers of denominators of internal lines, the space-time dimension n also being arbitrary. Special cases are considered when two (or more) masses are equal to zero. The results are represented in terms of hypergeometric functions. 23 refs.; 3 figs.

32097 (INP-MSU–91-10-214) **A simple formula for reducing Feynman diagrams to scalar integrals.** Davydychev, A.I. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1991. 12p. (NIIYaF-MGU–91-10-214.). Order Number DE92644717. Source: OSTI; NTIS (US Sales Only); INIS.

An explicit general formula is obtained which makes it possible to reduce tensor Feynman integrals (corresponding to arbitrary one-loop N-point diagrams) to scalar integrals. 10 refs.

32098 (INP-MSU–91-11-215) **Anomaly-free gauges in superstring theory and double supersymmetric sigma-model.** Demichev, A.P.; Iofa, M.Z. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1991. 25p. (NIIYaF-MGU–91-11-215.). Order Number DE92644733. Source: OSTI; NTIS (US Sales Only); INIS.

Superharmonic gauge which is a nontrivial analog of the harmonic gauge in bosonic string theory is constructed for the fermionic superstrings. In contrast to the conformal gauge, the harmonic gauge in bosonic string and superharmonic gauge in superstring theory are shown to be free from previously discovered BRST anomaly (in critical dimension) in higher orders of string perturbation theory and thus provide the setup for consistent quantization of (super)string theory. Superharmonic gauge appears to be closely connected with the supersymmetric σ-model with the target space being also a supermanifold. 28 refs.

32099 (INP-MSU–91-15-219) **From the Weyl theory to a theory of locally anisotropic space-time.** Bogoslovsky, G.Yu. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1991. 14p. (NIIYaF-MGU–91-15-219.). Order Number DE92644734. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that Weyl ideas, pertaining to local conformal invariance, find natural embodiment within the framework of a relativistic theory based on a viable Finslerian model of space-time. This is associated with the peculiar property of the conformal invariant Finslerian metric which describes a locally anisotropic space of events. The local conformal transformations of the Riemannian metric tensor leave invariant rest masses as well as all observables and thus appear as local gauge transformations. The corresponding Finslerian theory of gravitation turns out, as a result, to be an Abelian gauge theory. It satisfies the principle of correspondence with Einstein theory and predicts a number of nontrivial physical effects accessible for experimental test under laboratory conditions. 13 refs.

32100 (IPNO-TH--91-48) **Perturbative ground state energy of three anyons in a harmonic potential.** Khare, A. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique); McCabe, J. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Jun 1991. 13p. Order Number DE92570084. Source: OSTI; NTIS (US Sales Only); INIS.

The ground state energy of three anyons in a harmonic potential near fermionic statistics is calculated. The energy is given by: $E_0(\alpha)=\omega\{4+1.300\alpha^2+O(\alpha^3)\}$ where 4ω is the ground state energy of three fermions. It is compared with the energy of the exact eigenstate that interpolates to the ground state at $\alpha=1$ (bosonic statistics). There is a cross-over between ground states at $\alpha=.3$ where the two results coincide. (author) 13 refs., 1 fig.

32101 (JINR-E--2-90-587) **The system whose Hamiltonian is a time-dependent quadratic form in coordinates and momenta.** Chernikov, N.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1990. 19p. Order Number DE92644735. Source: OSTI; NTIS (US Sales Only); INIS.

The solution of the Schroedinger equation can be expressed algebraically in terms of the solution of the classical Hamiltonian equations in the case in which the Hamiltonian is a quadratic form in the coordinates x^a and momenta p_a and the coefficients of the form are arbitrary functions of the time t. The Fock representation is introduced for such a system. The results obtained are useful for the formulation of quantum field theory in an arbitrary space-time world. These results are also useful for consideration of the influence of classical gravitational and electromagnetic fields on quantized fields. 4 refs.

32102 (JINR-E--2-91-77) **On the energy-momentum tensors for field theories in spaces with affine connection and metric: Generalized Bianchi identities and different energy-momentum tensors.** Manoff, S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 16p. Order Number DE92644743. Source: OSTI; NTIS (US Sales Only); INIS.

Generalized covariant Bianchi type identities are obtained and investigated for Lagrangian densities, depending on co- and contravariant tensor fields and their first and second covariant derivatives in spaces with affine connection and metric (L_n-space). The notions of canonical, generalized canonical, symmetric and variational energy-momentum tensor are introduced and necessary and sufficient conditions for the existence of the symmetric energy-momentum tensor as a local conserved quantity are obtained. 19 refs.; 1 tab.

32103 (JINR-E--2-91-78) **On the energy-momentum tensors for field theories in spaces with affine connection and metric: Conditions for existence of energy-momentum tensors.** Manoff, S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 15p. Order Number DE92644744. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that the Euler-Lagrange equations for a material system in L_n space (in accordance with the case in U_n-space in contrast to the case in V_n space) cannot be used as sufficient conditions for the existence of the energy-momentum tensor as a local conserved quantity. The non-equivalent of Belinfante's and Hilbert's symmetric energy-momentum tensor for the general case is considered. It is shown from more general point of view that Einstein's tensor in the general relativity is equal to the symmetric energy-momentum tensor for the gravitational field. 16 refs.; 1 fig.

32104 (JINR-E--2-91-118) **A new exact solution to the classical equations of motion of the relativistic string with massive ends.** Barbashov, B.M.; Chervyakov, A.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 14p. Order Number DE92644736. Source: OSTI; NTIS (US Sales Only); INIS.

The classical histories of the relativistic string with massive ends in space-time are examined in terms of geometric invariants of both the string world surface and world lines of the point masses at the string ends. In this formulation the string variables are completely defined by means of the constant curvatures and torsions of the endpoint trajectories which are subjected to a system of differential equations with a delayed arguments that incorporates retardation effects of the interaction of two point masses through the string. The well-known example of the rotating straight-line string with massive ends corresponds to a particular solution of this system for the constant torsions. A new exact solution for the periodic torsions of the world trajectories of the massive string ends is found. In this case the string coordinates are represented in terms of normal elliptic integrals and describe a more intricate motion including its transverse vibrations than rotation of a stretched string in a given plane. 17 refs.

32105 (JINR-E--2-91-157) **Parasupersymmetric spinning particle and topological gauge fields.** Korchemskij, G.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 20p. Order Number DE92644737. Source: OSTI; NTIS (US Sales Only); INIS.

The first quantization of the D-dimensional relativistic spinning particle with the action invariant under reparametrizations and local worldline parasupersymmetric transformations is performed. The corresponding symmetry algebra is not of the Lie kind and is known as a polynomial algebra. It is found that the physical space of the massless particle is described by the strength tensors of abelian antisymmetric fields and topological gauge fields. 21 refs.

32106 (JINR-E--2-91-184) **Some problems of relativistic electrodynamics.** Strel'tsov, V.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 14p. Order Number DE92644738. Source: OSTI; NTIS (US Sales Only); INIS.

Some problems of electrodynamics are considered from the point of view of the radar formulation of relativity theory. This formulation is based on light or retarded distances, the increasing of longitudinal sizes of moving objects is its consequence (°longation formula). Based of Lienard-Wiechert potentials it is shown that in terms of retarded distances equipotential surfaces take the form of rotation ellipsoids, stretched in the direction of electric charge motion. The difficulty connected with the appearance of charge in a moving (neutral) current-carrying conductor is overcome. 23 refs.; 4 figs.

32107 (JINR-E--2-91-195) **Invariant structures in gauge theories and confinement.** Prokhorov, L.V. (Leningradskij Gosudarstvennyj Univ., Leningrad (Russian Federation)); Shabanov, S.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 20p. Order Number DE92644739. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nucl. Phys., B.

The problem of finding all gauge invariants is considered in connection with the problem of confinement. Polylocal gauge tensors are introduced and studied. It is shown (both in physical and pure geometrical approaches) that the path-ordered exponent is the only fundamental bilocal gauge tensor, which means that any irreducible polylocal gauge tensor is built of P-exponents and local tensors (matter fields). The simplest invariant structures in electrodynamics, chromodynamics and a theory with the gauge group SU(2) are considered separately. 23 refs.; 2 figs.

32108 (JINR-E--2-91-260) **Quantum discrete gauge models with bosonic and fermionic degrees of freedom.** Filippov, A.T.; Gangopadhyay, D.; Isaev, A.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 27p. Order Number DE92644846. Source: OSTI; NTIS (US Sales Only); INIS.

A general approach to quantizing discrete models (i.e. having a finite number of coordinates) with quadratic first-class constraints is presented in the framework of gauging linear canonical symmetries. It is also proposed how a natural superextension of matrix field theories (viz. orthosymplectic 'zero dimensional' matrix field theories) might emerge in this approach. 17 refs.

32109 (JINR-E--2-91-266) **Invariant structures and static forces in gauge theories.** Prokhorov, L.V. (Leningradskij Gosudarstvennyj Univ., Leningrad (Russian Federation)); Shabanov, S.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation).

Lab. of Theoretical Physics. 1991. 12p. Order Number DE92644740. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Phys. Lett., B.

The problem of finding all gauge invariants is considered in connection with confinement. It is shown that any gauge invariant may be built of the exponential line integrals (strings) and local gauge group tensors. The Coulomb field structure is analyzed from this point of view. In the pure SU(n) gauge theory (no matter), a potential of interacting static sources is found to be linearly rising with distance. 16 refs.; 1 fig.

32110 (JINR-E-2-91-272) **On classical electrodynamics with distribution-valued sources.** Kapuscik, E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 16p. Order Number DE92644741. Source: OSTI; NTIS (US Sales Only); INIS.

A new formulation of classical electrodynamics is proposed. It is shown that the new formulation is free from the troubles of the standard theory. 8 refs.

32111 (JINR-E-2-91-281) **Energy division and hadron transverse momenta in the quark-gluon strings model.** Lykasov, G.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems); Sergeenko, M.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 12p. Order Number DE92644742. Source: OSTI; NTIS (US Sales Only); INIS.

The correlation of the average transverse momentum p_T abd the hadron multiplicity in the framework of the quark-gluon strings model (QGSM) is analyzed. It is shown that the successive division of the transverse momentum p_T between n-Pomeron showers results in the stronger dependence of p_T on the Pomeron number n and, consequently, on the multiplicity. The calculation results are compared with those obtained by the regular p_T division method. 26 refs.; 3 figs.

32112 (JINR-E-2-91-296) **Gottfried sum rule and mesonic exchanges in deuteron.** Kaptari, L.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Umnikov, A.Yu. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 6p. Order Number DE92644718. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Phys. Lett., B.

Recent NMC data on the experimental value of the Gottfried Sum are discussed. It is shown that the Gottfried Sum is sensitive to the nuclear structure corrections, viz. themesonic exchanges and binding effects. A new estimation of the Gottfried Sum is given. The obtained result is close to the quark-parton prediction of 1/3. 11 refs.; 2 figs.

32113 (LAPP-TH-292/90) **The algebraic versus geometric approach to quantum field theory.** Schroer, B. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Jun 1990. 25p. (CONF-9003264-: 4. Annecy meeting on theoretical physics: recent advanced in field theory, Annecy-le-Vieux (France), 5-9 Mar 1990). Order Number DE92570087. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nucl. Phys., B (NL).

Some recent developments in algebraic QFT are reviewed and confronted with results obtained by geometric methods. In particular a critical evaluation of the present status of the quantum symmetry discussion is given and the possible relation of the (Gepner-Witten) modularity in conformal QFT_2 and the Tomita modularity (existence of quantum reflections) of the algebraic approach is commented on. (author) 34 refs.

32114 (LAPP-TH-314/90) **Three-dimensional Ising Model and 2d-induced gravity.** Sedrakyan, A.G. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Oct 1990. 10p. Order Number DE92570121. Source: OSTI; NTIS (US Sales Only); INIS.

The three-dimensional Ising Model (3DIM) is investigated near the critical point. It will be shown, that in this limit in 3DIM there are induced gravitational modes, which are described by SL(2,R) current algebra with coupling constant K. The singularities of the two-dimensional surfaces, immersed in 3D euclidean space are taken into account. Their contribution to the partition function is equivalent to the contribution of the anyons with charge (K+4)/2 and conformal spin 1/2(1+[(K+4)/2]) included in the problem under consideration. The Knizhnik, Polyakov, Zamolodchikov equation for renormalized matter field coupling constant K changed and the solution D=3, K=0 is found. (author) 17 refs., 1 fig.

32115 (LAPP-TH-325/91) **Infrared singularities cancellation in reaction rates at finite temperature.** Altherr, T. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Jan 1991. 11p. Order Number DE92570089. Source: OSTI; NTIS (US Sales Only); INIS.

Using dispersion relations, the cancellation of infrared singularities is shown in reaction rates at finite temperature for topologies involving self-energy insertions at all orders of the perturbation theory. Feynman graphs are used exclusively, as in the Kinoshita approach. A crucial point is that the cancellation of mass singularities occurs within each topology. Other topologies and possible generalizations are also discussed. (R.P.) 13 refs., 2 figs.

32116 (LAPP-TH-326/91) **General construction of the Virasoro algebra from superalgebras.** Frappat, L.; Ragoucy, E.; Thuillier, F. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Feb 1991. 14p. Order Number DE92570090. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Phys. Lett., B (NL).

The Master equations leading to a generalization of the Sugawara construction for superalgebras are given. The $OSp(1—2)_k$ case is worked out in detail. In particular, a new continuous one parameter solution is found at level k=4, which is related by K-conjugation to the continuous solution of $SU(2)_4$. This new solution for $OSp(1—2)_4$ corresponds to the sum of a theory of a free boson (c=1) and of a model of a non-unitary minimal series with c=-14/11. (author) 13 refs., 2 tabs.

32117 (LAPP-TH-328) **Finiteness of the topological models in the Landau gauge.** Maggiore, N. (European Physical Society, Geneva (Switzerland)); Sorella, S.P. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Mar 1991. 15p. Order Number DE92570122. Source: OSTI; NTIS (US Sales Only); INIS.

A general procedure for showing the perturbative finiteness of topological field theories is presented. The main tools of the investigation are the existence of a supersymmetric algebra and the choice of a Landau gauge for the gauge-fixing part of the action. First the on-shell supersymmetry is introduced, then the Slavnov identity and the off-shell supersymmetric algebra, finally the quantum extensions and the perturbative finiteness are studied. As an explicit example, the three-dimensional BF-system with a nonvanishing cosmological term is discussed in details. (K.A.) 15 refs., 2 tabs.

32118 (LAPP-TH-331/91) **A Polyakov action on Riemann surfaces.** Zucchini, R. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Feb 1991. 12p. Order Number DE92570123. Source: OSTI; NTIS (US Sales Only); INIS.

A calculation of the effective action for induced conformal gravity on higher genus Riemann surfaces is presented. Our expression, generalizing Polyakov's formula, depends holomorphically on the Beltrami and integrates the diffeomorphism anomaly. A solution of the conformal Ward identity on an arbitrary compact Riemann surfaces without boundary is presented, and its remarkable properties are studied. (K.A.) 16 refs., 2 figs.

32119 (LAPP-TH-337/91) **Linear supermultiplets and nonholomorphic gauge coupling functions.** Binetruy, P. (Paris-11 Univ., 91 - Orsay (France). Lab. de Physique Theorique et Hautes Energies); Grimm, R.; Girardi, G. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Apr 1991. 12p. Order Number DE92570124. Source: OSTI; NTIS (US Sales Only); INIS.

The general couplings of linear multiplets, including Chern-Simons forms, to chiral matter as well as to the standard supergravity-matter system are constructed. Insisting on a canonically normalised Einstein term in particular the appearance of non-holomorphic gauge couplings are discussed and duality transformations in full generality are performed. The implications of these structures for the effective description of sigma model anomalies are presented with and without coupling to supergravity, following recent proposals of Derendinger, Ferrara, Kounnas and Zwirner and of Cardoso and Ovrut. (author) 14 refs.

32120 (LAPP-TH-342/91) **Continuous realizations of extended conformal algebras.** Ragoucy, E. (Grenoble Univ., 74 Annecy (FR). Laboratoire Physique Theorique ENSLAPP). Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Jun 1991. 14p. (CONF-9105372-: Topological and geometrical methods in field theory, Turku (Finland), 26 May - 1 jun 1991). Order Number DE92570094. Source: OSTI; NTIS (US Sales Only); INIS.

The Master equations for the Virasoro algebra constructed from a Kac-Moody algebra of a (basic) superalgebra, as well as the Master equations for the Super-Virasoro algebra built on a N=1 Super-Kac-Moody algebra realized in fermions, are presented. In both cases, a new solution depending on a free parameter (continuous solution) is found. The case of the W_3 algebra is also partially studied, and a new continuous solution is presented in the case of $SU(2)_2xSU(2)_2$. (author) 13 refs., 2 tabs.

32121 (LAPP-TH-344/91) **A comparison of the real-time and the imaginary-time formalisms of finite temperature field theory for 2,3, and 4-point Green's functions.** Aurenche, P.; Becherrawy, T. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Jul 1991. 22p. Order Number DE93703836. Source: OSTI; NTIS (US Sales Only); INIS.

The predictions of the real-time and the imaginary-time formalisms of Finite Temperature Field Theory is compared. Retarded and advanced amplitudes are constructed in the real-time formalism which are linear combinations of the usual time-ordered thermo-field dynamics amplitudes. These amplitudes can be easily compared to the various analytically continued amplitudes of the imaginary-time formalism. Explicit calculation of the 2,3 and 4-point Green's functions in ϕ^3 field theory is done in the one and two-loop approximations, and the compatibility of the two formalisms is shown. (author) 17 refs., 12 figs.

32122 (LA-UR-92-2471) **Baryon and lepton number violation in the standard model at high energy.** Mottola, E. Los Alamos National Lab., NM (United States). [1992]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9203176-1: Texas workshop on electroweak baryon number violation, New Haven, CT (United States), 18-21 Mar 1992). Order Number DE92018607. Source: OSTI; NTIS; INIS; GPO Dep.

The status of baryon and lepton number violation in the standard Weinberg-Salam electroweak theory at energies of order $M_W/\alpha W$ and higher is reviewed.

32123 (NIKHEF-H-92-05) **On Gupta-Bleuler quantization of systems with second-class constraints.** Kalau, Wolfgang. Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H. 10 Feb 1992. 18p. Order Number DE93602500. Source: OSTI; NTIS; INIS.

In this paper Hamiltonian systems with mixed first and second-class constraints are discussed. The authors prove that in a neighborhood of the constraint surface the complexified constraints can always be split into a holomorphic and an anti-holomorphic set, such that the holomorphic set can be implemented consistently on the ket-states of the corresponding quantum theory. The quantization is performed with BRSY-methods using a non-hermitian BRST-operator. As an example this method is used to quantize the 4-dimensional superparticle. (author). 25 refs.

32124 (NIKHEF-H-92-06) **Operator algebra from fusion rules II: implementing apparent singularities.** Fuchs, Juergen. Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H. Feb 1992. 31p. Order Number DE93602555. Source: OSTI; NTIS; INIS.

Classification of rational conformal field theories is essentially equivalent to classification of all possible four-point functions for the primary fields of the theories. An interesting set of parameters appearing in the latter classification is given by the number and the positions of so-called apparent singularities of the differential equations which are obeyed by the four-point functions. The subject of this paper is a detailed analysis of the role played by these parameters. In particular the restrictions imposed on them by general principles of two-dimensional conformal field theory are worked out, and the implications on the classification programme are discussed. (author). 46 refs.

32125 (NIKHEF-H-92-07) **The Mathai-Quillen formalism and topological field theory.** Blau, Matthias. Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H. 1992. 34p. (CONF-9202128-: Karpacz winter school on infinite dimensional geometry in physics, Karpacz (Poland), 17 Feb 1992). Order Number DE93602506. Source: OSTI; NTIS; INIS.

Notes of lectures given at the Karpacz Winter School on 'Infinite Dimensional Geometry in Physics' 17-27 february 1992.

These lecture notes give an introductory account of an approach to cohomological field theory due to Atiyah and Jeffrey which is based on the construction of Gaussian shaped Thom forms by Mathai and Quillen. Topics covered are: an explanation of regularized Euler numbers of infinite dimensional vector bundles; interpretation of supersymmetric quantum mechanics as the regularized Euler number of loop space; the Atiyah-Jeffrey interpretation of Donaldson theory; the construction of topological gauge theories from infinite dimensional vector bundles over space of connections. (author). 44 refs.

32126 (OUP-91-30) **General relativistic model of a spinning cosmic string.** Jensen, B.; Soleng, H.H. Oslo Univ. (Norway). Fysisk Inst. Nov 1991. 15p. Order Number DE92644745. Source: OSTI; NTIS; INIS.

The authors investigate the infinite, straight, rotating cosmic string within the framework of Einstein's General Theory of Relativity. A class of exact interior solutions is derived for which the source satisfies the weak and the dominant energy conditions. The interior metric is matched smoothly to the exterior vacuum. A subclass of these solutions has closed time-like curves both in the interior and the exterior geometry. 39 refs., 2 figs.

32127 (OUP-92-05) **Gravitational effect of the quantum vacuum outside a cosmic string.** Groen, Oe.; Soleng, H.H. Oslo Univ. (Norway). Fysisk Inst. Feb 1992. 15p. Order Number DE92644746. Source: OSTI; NTIS; INIS.

The conical geometry of static cylindrically symmetric cosmic string causes a non-vanishing contribution to the vacuum expectation value of the energy-momentum tensor of a quantum field. A model of a cosmic string is constructed, taking into account the gravitational field of this energy-density. The strongly curved interior of the string is modelled by a homogeneous fluid with vanishing tangential and radial stress. The integrated effect of vacuum polarization in this region is assumed to be accounted for by a singular layer with a traceless energy-momentum surface density at the surface of the string. The total Tolman mass of the system is positive, so the string produces an attractive gravitational field. 23 refs.

32128 (SSCL-Preprint-123) **Superstring derived standard-like models and the top quark mass hierarchy.** Faraggi, A.E. (Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics). Superconducting Super Collider Lab., Dallas, TX (United States). 15 Jun 1992. 5p. Sponsored by USDOE, Washington, DC (United States); Feinberg School Fellowship (United States). DOE Contract AC35-89ER40486. (WIS-92/49/NOV-PH;CONF-9205228-1: 15. international Warsaw meeting on elementary particle physics, Kazimierz (Poland), 25-29 May 1992). Order Number DE92018101. Source: OSTI; NTIS; INIS; GPO Dep.

I propose that the large mass splitting between the top and bottom quarks is a signature of a class of superstring derived standard-like models. In these models only +2/3 charged quarks obtain a trilevel mass term. Mass terms for the lighter quarks and leptons are obtained from higher order terms in the superpotential. These models contain an "anomalous" U(1) gauge symmetry. Application of the Dine-Seiberg-Witten mechanism cancels the anomaly leaves a cubic level mass term only for the top quark.

6622 Specific Theories and Interaction Models; Particle Systematics

Refer also to citation(s) 32093, 32094, 32106, 32160, 32184, 32191, 32195, 32220, 32233, 32281

32129 (CEA-N-2680) **The finite temperature QED vacuum, within the mean field approximation.** Chaix, P. CEA Centre d'Etudes de Bruyeres-le-Chatel, 91 (France). Dec 1991. 16p. (In French). Order Number DE93701123. Source: OSTI; NTIS (US Sales Only); INIS.

This report is made of two largely independent parts. The first one deals with a finite temperature generalization of a mean field theory which we already used for a study of the QED vacuum stability against the 2-body coulomb interaction. We show that temperature does not change the stability conditions, and we study the solutions of the gap equations, especially in the high temperature domain. The second part is devoted to photons rather than electrons; we evaluate the first vacuum polarization corrections to the properties of back-body radiation, considering the Euler-Heisenberg photon-photon interaction within the mean-field approximation.

32130 (CNIC-00463) **Skyrmions of different types.** Li Tiezhong (Academia Sinica, Beijing, BJ (China). Inst. of High Energy Physics). China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 10p. (In Chinese). (BIHEP-0016.). Order Number DE93602581. Source: OSTI; NTIS (US Sales Only); INIS.

Two models of Skyrmions are suggested. In one of them the vector mesons $Z_\mu{}^0$ and $W_\mu{}^\pm$ may stabilize the Skyrmion formed by Higgs bosons. In the other, the Skyrmion is composed of three preons via the interaction with the Higgs bosons.

32131 (CRN-HE-91-05) **Quark-gluon plasma searches: today and tomorrow.** Geist, W.M. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1991. 26p. Order Number DE92570097. Source: OSTI; NTIS (US Sales Only); INIS.

Selected recent data from ion collisions at high energy are discussed in the frame-work of Quark-Gluon Plasma (QGP) searches. The purpose of these experiments is to measure the volume where a high temperature QGP may have been formed, determine its characteristic temperature, verify chemical equilibrium, establish deconfinement of this phase of matter, and/or find anything that differs from natural extrapolations from pp and pA collisions. Refined methods and new theoretical ideas for future experiments with heavier beams and/or at higher energies are briefly outlined. (G.P.) 49 refs., 28 figs.

32132 (GANIL-P-91-17) **Intermittency in the particle production and in the nuclear multifragmentation.** Bozek, P. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Ploszajczak, M. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 9p. (CONF-9108212-: Symposium on nuclear physics, Tours (France), 29-31 Aug 1991). Order Number DE92570070. Source: OSTI; NTIS (US Sales Only); INIS.

Intermittency is a manifestation of scale invariance and randomness in physical systems. Intermittency in relativistic heavy-ion collisions and, in particular, the projectile dependence, multiplicity dependence and source-size dependence are discussed in the frame of the model of spatio-temporal intermittency. Moreover, recent theoretical results in intermittency studies of the nuclear multifragmentation are presented. (author) 35 refs., 4 figs., 1 tab.

32133 (IC-92/137) **Dielectric and magnetic permittivities of the QED vacuum caused by dyon.** Shnir, Ya.M. (International Centre for Theoretical Physics, Trieste (Italy)); Tolkachev, E.A.; Tomil'chik, L.M. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 9p. Order Number DE92644888. Source: OSTI; NTIS (US Sales Only); INIS.

The effect of the virtual pair creation of the scalar electric charged particles in the field of dyon is calculated in the one-loop approximation. It is shown that this vacuum antishields the magnetic charge of dyon and shields its electric charge. (author). 18 refs.

32134 (IC-92/139) **Weak probes and the Gottfried sum rule.** Kamran, M. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 7p. Order Number DE92644913. Source: OSTI; NTIS (US Sales Only); INIS.

We investigate the possibility of probing the flavour asymmetric nucleon sea in the LLA using ν and ν-bar projectiles. We find that for the NC case it is difficult to disentangle the effects of this flavour asymmetry from other contributions in a clean way. However, it is possible to obtain a sizeable effect for the CC case which can easily be isolated. Our conclusions are valid up to first order in α. (author). 23 refs.

32135 (INIS-mf-14069, pp. 18-20) **NA 38 future.** Gorodetzky, P. (CRN, 67 - Strasbourg (France)). NA 38 Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195-: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. QUARK MATTER/lead 208 beams; NUCLEAR MATTER; MUON PAIRS; PIONS NEUTRAL; RELATIVISTIC RANGE; SHOWER COUNTERS; MULTIPLE PRODUCTION; HEAVY ION REACTIONS; MULTIPLICITY

32136 (INIS-mf-14069, pp. 126-131) **Stopping power and viscosity of the quark-gluon plasma.** Thoma, M.H. (Physik Dept. T30, Technische Univ. Muenchen, Garching (Germany)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195-: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Various approximations for the collisional energy loss of a high energy quark or gluon in the quark-gluon plasma are compared. The radiative energy loss is estimated and shown to dominate. The shear viscosity coefficient of the quark-gluon plasma is considered. Implications for signals of the formation of a quark-gluon plasma and for its expansion phase in ultrarelativistic heavy ion collisions are discussed. (orig.).

32137 (INIS-mf-14069, pp. 132-135) **The self consistent quark-gluon plasma.** Polonyi, J. (Center for Theoretical Physics, Lab. for Nuclear Science, and Dept. of Physics, Massachusetts Inst. of Tech., Cambridge, MA (United States)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. Contract DE-AC02-76ER03069;Grant NSF PYI PHY-8958079. (CONF-920195-: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. QUARK MATTER/self-consistent field; BARYON NUMBER; QUANTUM CHROMODYNAMICS; INFRARED DIVERGENCES; SEMICLASSICAL APPROXIMATION; PERTURBATION THEORY

32138 (INIS-mf-14069, pp. 141-146) **Nucleon electric form factors and quark sea polarization in the Nambu-Jona-Lasinio model.** Gorski, A.Z. (Inst. fuer Theoretische Physik II, Univ. Bochum (Germany)); Gruemmer, F.; Goeke, K. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195-: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

The nucleon electric form factors are extracted from the solitonic solution of the Nambu-Jona-Lasinio model. To this end the model is solved self-consistently in the SU (2) sector with scalar coupling using the zero-boson and one-quark loop approximation. Squared radii, charge distributions and the Coulomb energy splitting are calculated as well. For constituent masses around M = 400 MeV one obtains good agreement with the experimental data. In all cases the vacuum polarization contributes to the observables to less then 15% except the neutron from factor that shows 30% sea quark contribution. (orig.).

32139 (INIS-mf–14069, pp. 158-159) **The chiral and the deconfinement phase transition in the chromodielectric model.** Rosina, M. (Faculty of Natural Sciences and Technology, and Stefan Inst., Univ. of Ljubljana (Slovenia)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. QUANTUM CHROMODYNAMICS/phase transformations; CHIRAL SYMMETRY; BAG MODEL; QUARK MATTER; NUCLEAR MATTER; EQUATIONS OF STATE; QUARKS

32140 (INIS-mf–14069, pp. 160-164) **Hadronic and quark screening lengths from lattice QCD.** Boyd, G. (Hoechstleistungsrechenzentrum, Juelich (Germany)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. QUANTUM CHROMODYNAMICS/quarks; SCREENING; HADRONS; LATTICE FIELD THEORY; QUARKS; PHASE TRANSFORMATIONS; DISPERSION RELATIONS; PROPAGATOR; QUARK MATTER; CHIRAL SYMMETRY

32141 (INIS-mf–14069, pp. 245-248) **Dilepton radiation from partially equilibrated parton matter.** Kaempfer, B. (ZfK Rossendorf, Dresden (Germany)); Pavlenko, O.P.; Heide, B. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Dilepton radiation from parton (quark-gluon) matter, produced in ultrarelativistic heavy-ion collisions, is calculated within a kinetic theory approach. The influence of non-equilibrium effects of the partons is studied. We investigate the departure from a supposed equilibrium stage due to longitudinal expansion. (orig.).

32142 (JINR-E–2-91-115) **H^+H^- interaction up to higher orders of perturbation theory in the model with two Higgs doublets (Lagrangian and one-loop amplitudes).** Dvoeglazov, V.V. (Saratovskij Gosudarstvennyj Univ., Saratov (Russian Federation)); Skachkov, N.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 24p. Order Number DE92644873. Source: OSTI; NTIS (US Sales Only); INIS.

The one-loop amplitude of the Higgs-Higgs interaction is calculated in the fourth order of perturbation theory in the framework of the model with two Higgs doublets and an arbitrary number of fermions. The Lagrangian of this interaction is taken without any approximations. The vertex coupling constants like f^{3H}, f^{HHV}, etc., are taken as given by the minimal SUSY extension of the Standard Model. 7 refs.; 1 fig.

32143 (JINR-E–2-91-253) **Hadronization of QCD.** Ebert, D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 6p. Order Number DE92644896. Source: OSTI; NTIS (US Sales Only); INIS.

Invited talk presented at the recontrse de Moriond meeting ^{H}igh Energy Hadronic Interactions' March 17-23, 1991.

This talk is meant to give an introduction into the main ideas of hadronization of QCD without almost any formalism. As it turns out, QCD bound states, constituent quark masses, and spontaneous chiral symmetry breaking may now be understood within a coherent framework. 7 refs.; 2 tabs.

32144 (JINR-E–2-91-262) **Parameters of low-energy physics, radial excitations of π, K, D mesons and QCD potential.** Sarikov, N.A. (AN Uzbekskoj SSR, Tashkent (Uzbekistan). Inst. Yadernoj Fiziki); Zhuraev, O.M.; Puzynin, I.V.; Pervushin, V.N.; Amirkhanov, I.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 14p. Order Number DE93602603. Source: OSTI; NTIS (US Sales Only); INIS.

The parameters of low-energy physics of π, K, D mesons, masses of their radial excitations, wave functions, and leptonic decay constants $F_{\pi,\pi',K,K',D,D'}$ are calculated in terms of fundamental parameters of the QCD effective potential in the new relativistic potential model. 22 refs.; 10 figs.; 2 tabs.

32145 (JINR-E–11-91-108) **Newtonian iterative scheme for solving Schwinger-Dyson equation for a quark.** Amirkhanov, I.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Pervushin, V.N.; Puzynin, I.V.; Juraev, O.M.; Sarikov, N.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 15p. Order Number DE93602602. Source: OSTI; NTIS (US Sales Only); INIS.

Newtonian iterative scheme is used for solving the integro-differential Schwinger-Dyson equation for a quark. A suggested modification of this scheme reduces the solution of the input nonlinear boundary value problem to the solution of a sequaence of boundary value problems for linear differential equation. The program DYSON for IBM PC/AT computer is presented. 19 refs.; 3 figs.; 3 tabs.

32146 (JINR-R–2-91-140) **Calculation of the Higgs boson decay widths into boson pairs.** Bardin, D.Yu. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Vilenskij, B.M.; Khristova, P.Kh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 20p. (In Russian). Order Number DE92644874. Source: OSTI; NTIS (US Sales Only); INIS.

The decay widths of the Higgs boson into $\gamma\gamma$,$Z\gamma$,ZZ and W^+W^- are calculated on the one-loop level of the electroweak theory. Exact analytic formulae in terms of complex-valued dilogarithms are obtained. The dependence of the decay widths on the Higgs boson mass and on the top-quark mass are investigated. 12 refs.; 10 figs.; 1 tab.

32147 (LAL–91-61) **Testing the neutral Higgs sector of the M.S.S.M. with a 300-500 GeV e^+e^- collider.** Janot, P. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Nov 1991. 26p. (CONF-9109422–: ICFA workshop, Hamburg (Germany), Sep 1991). Order Number DE92570115. Source: OSTI; NTIS (US Sales Only); INIS.

In order to search for the three neutral Higgs bosons h, H and A predicted by the Minimal Supersymmetric extension of the Standard Model (MSSM), an analysis of the final state $\tau^+\tau^-$qq-bar is developed. This single analysis would lead either to rule out the MSSM with a 300 to 500 GeV electron-positron collider if no signal were detected, or to find one scalar (and standard-like) Higgs boson via the production processes $e^+e^- \to hZ$ and/or $e^+e^- \to HZ$. The case of an 'invisible' Higgs boson is also treated and leads to the same conclusions. Furthermore, if $m_A \leq 200$ GeV/c^2, h, H and A would show up together thanks to the complementary processes $e^+e^- \to hA$ or HA, thus allowing to disentangle the MSSM Higgs sector from the Standard Model one. (author) 13 refs., 14 figs.

32148 (LAPP-TH–333/91) **Spontaneous decoupling of extended Gauge models.** Chiappinelli, A. (Trieste Univ. (Italy). Ist. di Fisica Teorica); Verzegnassi, C. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Apr 1991. 7p. Order Number DE92570092. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that for certain extended Gauge models the condition of vanishing of the Z-Z' mixing angle automatically reproduces the Georgi-Weinberg theorem. Thus, for such models, a simultaneous spontaneous decoupling both on Z resonance and in q^2=0 neutrino scattering might occur. (author) 10 refs.

32149 (LAPP-TH–339/91) **Exotic fermion mixing revisited.** Chiappinelli, A. (Trieste Univ. (Italy). Ist. di Fisica Teorica). Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. May 1991. 11p. Order Number DE92570093. Source: OSTI; NTIS (US Sales Only); INIS.

New limits on the exotic fermion mixing for charged particles of the 27 dimensional E_6 representation are obtained from last LEP 1 data taking into account the Z-Z' mixing and the recent evaluations on extra Higgs doublet effects on the Z partial widths. With the exception of a small window in the space of the neutral Higgses masses, the bound on the amount of exotic mixing is of the order of one per cent for the τ lepton and six per cent for the b quark at two Standard Deviations, improving noticeably the results of previous analyses. (author) 13 refs., 1 tab.

32150 (LAPP-TH–346/91) **Massive fermion dispersion relation at finite temperature.** Petitgirard, E. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Aug 1991. 11p. Order Number DE93703829. Source: OSTI; NTIS (US Sales Only); INIS.

The extension to the massive case of fermionic excitations in a QED/QCD plasma at high temperature is studied in detail. Calculations for light massive fermions are performed over the whole range of the three-momentum. Analytical and numerical results show that the collective mode is no longer significant for $m > gT$, whereas the usual particle excitation evolves rapidly to a free-particle state. (author) 9 refs., 2 figs.

6623 Specific Interactions, Decays and Processes

Refer also to citation(s) 32134, 32188, 32189, 32196, 32226, 32256, 32260, 32261, 32262, 32263, 32264, 32265

32151 (ANL/CP–76715) **Electromagnetic excitation of nucleon resonances.** Lee, T.S.H. Argonne National Lab., IL (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920637–4: International conference on the structure of baryons and related mesons, New Haven, CT (United States), 1-4 Jun 1992). Order Number DE92019031. Source: OSTI; NTIS; INIS; GPO Dep.

Theoretical approaches for extracting the γ N ← → * matrix elements from the data of γ N → π N and N(e,e ' π) reactions are reviewed. We discuss the physical content of the Δ resonance parameters listed in the table of particle properties.

32152 (ANL-HEP-CP–90-98) **Report of the subgroup on the top quark.** Barnett, R.M. (Lawrence Berkeley Lab., CA (USA)); Galtieri, A.B.; Hinchliffe, I.; Palounek, A.; Wacker, K.; Kauffman, R.; Trost, H.-J.; Yuan, C.-P.; Klein, S.; May, H.; Partridge, R.; Gunion, J.F.; Haber, H.E.; Hubbaard, B. Argonne National Lab., IL (United States). [1990]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38 ;AC02-76CH00016 ;AC02-76CH03000 ;AC03-76SF00098. (BNL–45848;CONF-9006267–9: 1990 DPF summer study on high energy physics, Snowmass, CO (United States), 25 Jun - 13 jul 1990). Order Number DE91004430. Source: OSTI; NTIS; INIS; GPO Dep.

The top group studied discovery issues at the Tevatron as well as measurements to be made at LHC and SSC. Mass measurements, branching ratios, distributions and other issues were studied. 12 refs., 18 figs.

32153 (CEA-CONF–10837) **Strangeness production in the $pp \rightarrow pK^+Y$ and $pA \rightarrow pK^+X$ reactions at Saturne.** Arvieux, J. (Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)); Brochard, F.; Bertini, R.; Bland, L.C.; Jacobs, W.W.; Vigdor, S.E.; Balestra, F. Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1991. 2p. (CONF-911208–: International symposium on hypernuclear and strange particle physics, Shimoda (Japan), 9-12 Dec 1991). Order Number DE92566698. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. STRANGENESS/particle production; PROTON-PROTON INTERACTIONS/strangeness; PROTON-PROTON INTERACTIONS/particle production; PROTON-PROTON INTERACTIONS/saturne; STRANGENESS; SATURNE; HYPERONS; INCLUSIVE INTERACTIONS; SPIN ORIENTATION; OBE MODEL; QUANTUM CHROMODYNAMICS; KAONS PLUS; NUCLEAR STRUCTURE; NUCLEAR MATTER

32154 (CEA-CONF–10839) **Spin observables in the $pp \rightarrow pK^+Y$ reactions at Saturne.** Arvieux, J. (Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)); Brochard, F.; Bland, L.C.; Jacobs, W.W.; Vigdor, S.E.; Balestra, F.; Bertini, R.; Bossolasco, S.; Bussa, M.P.; Fava, L.; Ferrero, L.; GarfagninLaboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1991. 7p. (CONF-9108215–: Hadron 91 Congress, College Park, MD (United States), 12-16 Aug 1991). Order Number DE92566699. Source: OSTI; NTIS (US Sales Only); INIS.

No data at all exist for spin observables of the associated production reactions $pp \rightarrow pK^+Y$, from threshold up to 2.9 GeV.This energy domain is covered by the Saturne accelerator. The study of spin observables in strangeness production at Saturne will be done designing an exclusive experiment. The authors need a magnetic analysis of the reaction products and plan to identify the strangeness production reaction through the vertex cut method. The detectors chosen are described. In order to evaluate the performance of the proposed magnet and detector system, they have carried out Monte Carlo simulations of the reactions of interest with the code GEANT.

32155 (DOE/ER/03948–19) **Hadronic interactions at intermediate energies: Progress report, November 1987.** Mayes, B.W.; Hungerford, E.V. Texas Univ., Houston, TX (United States). Dept. of Physics. [1987]. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AS05-76ER03948. Order Number DE92018400. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses research on the following topics: Hyperon physics at the AGS; strange dibaryons; muon decay into electron and gamma ray experiment; inelastic antineutron-proton scattering; antinucleon-nucleon interactions; and photoproduction of high transverse momentum jets. (LSP).

32156 (GANIL-P–91-23) **Finite-size scaling in the multiparticle production.** Bozek, P. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Ploszajczak, M. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 15p. Order Number DE92570105. Source: OSTI; NTIS (US Sales Only); INIS.

The finite-size scaling analysis of the scaled factorial moment data is proposed. This analysis allows to extract the scaling indices of the underlying higher-dimensional scale-invariant multiparticle distributions. Moreover, it exhibits the change of the effective scale involved in the dimensional projection with transverse momentum cuts applied to the data. (author) 15 refs., 2 figs.

32157 (IC–92/166) **Hadron nucleon interactions in view of a multi-peripheral model.** Hussein, M.T. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 22p. Order Number DE92644960. Source: OSTI; NTIS (US Sales Only); INIS.

A dynamical phase space model is proposed to describe the hadron-hadron interactions at few GeV incident energy. A matrix element of a multiperipheral nature is used whose parameters are strongly correlated to the final state multiplicity. A simplified quark-quark interaction picture is considered to improve the results. The multiplicity distribution, the inclusive rapidity and longitudinal momentum distributions are reproduced for the π^-p interactions at 6.1 GeV. (author). 11 refs, 6 figs, 2 tabs.

32158 (IHEP-OTF–91-33) **Single t-quark production in high energy γe collisions.** Jikia, G.V. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1991. 23p. Order Number DE92644947. Source: OSTI; NTIS (US Sales Only); INIS.

The explicit formulae for the cross sections of single t-quark production in γe collisions are presented. The contribution of the hadronic structure of the photon to the production cross sections is also calculated. Total t-quark and fourth generation b'-quark production rates and discuss theoretical uncertainties are evaluated. Assuming the luminosity of 10^{33} cm^{-2}s^{-1} in TeV energy range we estimate that the Cabibbo-Kobayashi-Maskawa matrix element V_{tb} can be probed to an accuracy of (3-5)%. 14 refs.; 12 figs.; 1 tab.

32159 (INIS-mf--14069, pp. 21-25) **Systematics of charm hadroproduction.** Vogt, R. (Gesellschaft fuer Schwerionenforschung (GSI), Darmstadt (Germany)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We discuss a two-component model of open charm produktion including high momentum transfer parton fusion and an intrinsic charm-component of the projectile. Our model has been applied to charm production in hadron-hadron and hadron-nucleus interactions. We also discuss applications to RHIC physics. (orig.).

32160 (INIS-mf--14069, pp. 136-140) **Dynamical simulation of quark systems within a covariant transport approach.** Kalmbach, U. (Inst. fuer Theoretische Physik, Univ. Giessen (Germany)); Vetter, T.; Biro, T.S.; Mosel, U. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Based on the Friedberg-Lee model and its color dielectric extension we formulate a transport theory to describe the phase space evolution of nucleon-nucleon collisions on the quark level. The Vlasov equation is solved using two kinds of testparicles. (orig.).

32161 (INIS-mf--14069, pp. 249-253) **The meson contribution to semi-inclusive deep inelastic scattering with slow protons in the final state.** Korpa, C.L. (Kernfysisch Versneller Inst., Groningen (Netherlands)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We analyze the light-meson-exchange contribution to semi-inclusive leptoproduction on protons, with a slow nucleon in the final state. The dominant contribution at small Bjorken χ comes from pion exchange, through production of an intermediate delta which subsequently decays into a pion and a nucleon. This previously neglaceted contribution os necessary for obtaining reasonable agreement with recent experimental results. The contribution of the (somewhat controversial) scalar meson my be also significant. (orig.).

32162 (IPNO-DRE--91-22) **Meson physics at Saturne.** Siebert, R. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 15p. (CONF-9105257--: Workshop on meson production, interaction and decay, Krakow (Poland), 6-11 May 1991). Order Number DE92570107. Source: OSTI; NTIS (US Sales Only); INIS.

After a short description of its facilities, the recent meson production program at the 'Laboratoire National Saturne' (LNS) is presented. Pion physics plays today a minor role, whereas η, η' and ϕ meson production is studied in various reactions. The main tools of the experiments are the four high quality magnetic spectrometers SPES I to IV, which have complementary properties. In addition, there exists a large solid angle multiparticle detector (DIOGENE), a non-magnetic 4π detector (ARCOLE) and two setups to detect γ_s, from π^0- and η-decays (SPESO and PINOT). First results of these experiments are presented together with theoretical aspects. Two new important meson programs are also presented. (R.P.) 13 refs., 7 figs., 2 tabs.

32163 (IPNO-TH--91-15) **On NN → ΔN transition: Bohr's rules and optimal formalism.** Auger, J.P. (Orleans Univ., 45 (FR). Lab. de Physique Corpusculaire, Atomique et Theorique); Lazard, C. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Jun 1991. 36p. Order Number DE92570077. Source: OSTI; NTIS (US Sales Only); INIS.

The polarization structure of the NN → ΔN transition is presented in a very compact way using two kinds of formalisms. First, spin-space decomposition adapted for describing Bohr's rules is recalled. Second, optimal formalism is applied to the transition. It is adapted for taking into account Bohr's relations and explicitly developed in helicity and transversity frames. Tables of transformation are given which simply relate observables defined in different formalisms. (author) 18 refs., 2 figs., 7 tabs.

32164 (ISN--90-59) **Some open issues in nucleon-antinucleon interaction.** Richard, J.M. Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires. 5 Aug 1990. 5p. (CONF-900777--: Workshop on science at the KAON factory, Vancouver (Canada), 23-28 Jul 1990). Order Number DE93703451. Source: OSTI; NTIS (US Sales Only); INIS.

The conventional picture of the NN-bar (nucleon-antinucleon) interaction at low energy relies on the superposition of a long-range elastic potential and a short-range absorption. The meson-exchange model, which has been successful until the opening of LEAR, is not likely to survive the LEAR-ACOL era. Recent data on spin observables contradict the predictions of potential models. Annihilation and long-range forces are discussed as well as quasi-bound baryonium states. (K.A.) 11 refs.

32165 (JINR-E--2-91-183) **On the problem of enhancement of neutrino oscillation in matter.** Beshtoev, Kh.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 7p. Order Number DE92644948. Source: OSTI; NTIS (US Sales Only); INIS.

The Wolfenstein mechanism of enhancement of neutrino oscillation in matter is discussed. The conclusion that it is ineffective is drawn. A mechanism of enhancement of neutrino oscillation based on the so-called 'horizontal' symmetry is proposed. 10 refs.; 1 tab.

32166 (JINR-R--2-91-211) **Analysis of $\pi\pi$ scattering with taking account of the KK-bar abd $\eta\eta$ thresholds.** Meshcheryakov, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Surovtsev, Yu.S.; Krupa, D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 11p. (In Russian). Order Number DE93602624. Source: OSTI; NTIS (US Sales Only); INIS.

A procedure to take into account the 8-sheeted structure of the Riemann surface of the 3-channel S matrix is proposed. The resonance representation on this surface is discussed. To define the resonance parameters, the experimental data on the isoscalar s-wave $\pi\pi$ scattering in the region including the KK-bar and $\eta\eta$ thresholds (0.7-1.6 GeV) are analyzed. 21 refs.; 2 figs.; 2 tabs.

32167 (JINR-R--4-91-163) **On a method of solution of dispersion equations for low-energy pion-pion scattering.** Zhuravlev, V.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 8p. (In Russian). Order Number DE93602625. Source: OSTI; NTIS (US Sales Only); INIS.

An approach is proposed for solving dispersion equations for low-energy pion-pion scattering used earlier in solving equations of the static model. The approach is illustrated for an exactly solvable model. 4 refs.

32168 (LAL--91-45) **Search for new phenomena at LEP.** Richard, F. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Oct 1991. 39p. Order Number DE92570111. Source: OSTI; NTIS (US Sales Only); INIS.

A systematic exploration of LEP data based on specific channels is presented. First the indirect method is described and a set of limits on new particles are given, obtained from the line shape measurements. Z^0 width measurements and forbidden Z^0 decays are discussed, involving pure photonic final states and flavour violating leptonic states. Then a systematic exploration of new phenomena based on leptonic final states is presented. Hadronic final states with missing energy or the presence of isolated particles, leptons or photons, will serve to set limits primarily in the Higgs sector. (K.A.) 34 refs., 16 figs., 8 tabs.

32169 (LAL–91-47) **Search for new particles in the SUSY framework.** Wormser, G. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Oct 1991. 15p. Order Number DE92570112. Source: OSTI; NTIS (US Sales Only); INIS.

The search for new particles predicted by supersymmetric models performed by the four LEP experiments up to the summer 1991 are reported. The samples used in this report corresponds to a range of 100,000 to 300,000 hadronic Z^0 decays. No signal is observed in any of the channels: sqos. These negative results are interpreted in the framework of the MSSMuarks, sleptons, Higgs bosons (either neutral or charged) and neutralin model. The important implications of one-loop correction effects are discussed in some detail. (author) 21 refs., 4 figs., 4 tabs.

32170 (LAL–91-49) **Heavy flavour physics at LEP.** Roudeau, P. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Nov 1991. 26p. (CONF-9107172–: 15. joint international lepton photon symposium at high energies and European Physical Society (EPS) conference on high energy, Geneva (Switzerland), 25 Jul - 1 aug 1991). Order Number DE92570114. Source: OSTI; NTIS (US Sales Only); INIS.

The hadronic Z^0 decays, registered at LEP in 1990 are studied. The forward-backward asymmetry of the b quark production and b lifetime measurements are discussed. B^0 and B^+ lifetime measurements using correlations between a lepton and a charm particle in semi-leptonic decays and evidence for Λ_b production are described. The partial width of Z^0 into bb-bar pairs was also measured. Concerning the charm sector, measurements on D^* production which give access to the c quark fragmentation function and to the partial width of the Z^0 into cc-bar pairs are described. Tau lifetime measurements are also discussed. (K.A.) 48 refs., 40 figs., 3 tabs.

32171 (LAL–91-62) **Higgs production in a photon-photon collider.** Richard, F. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Nov 1991. 18p. (CONF-9106391–: Intermediate meeting of EE500 working groups, Annecy (France), 10-11 Jun 1991). Order Number DE92570116. Source: OSTI; NTIS (US Sales Only); INIS.

The basic considerations determining the parameters of a photon-photon collider are presented. The laser power needed for the various schemes envisaged for a 500 GeV e^+e^- collider is derived, and the predicted values for $\Gamma(H \rightarrow \gamma\gamma)$ are discussed, assuming a standard Higgs boson and the expected rates for the signal and for the channels contributing to the background. Some procedures to improve the signal to background ratio are indicated. As an illustrative example, the standard neutral Higgs boson production and detection are described. (R.P.) 13 refs., 11 figs., 1 tab.

32172 (LAL–91-63) **Prospects for supersymmetry discoveries at a 500 GeV e^+e^- collider.** Grivaz, J.F. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Nov 1991. 34p. (CONF-9109374–: Workshop on physics and experiments with linear colliders, Saariselkae (Finland), Sep 1991). Order Number DE92570120. Source: OSTI; NTIS (US Sales Only); INIS.

The potential of a 500 GeV electron-positron collider for the discovery of supersymmetry is confirmed. If the MSSM is valid, at least one of its neutral Higgs bosons will be discovered. Moreover, the simultaneous observation of the three neutral Higgs bosons predicted by the model could decisively prove it. As shown by analyses incorporating realistic beam conditions and detector performances, charginos or scalar leptons can be discovered even close to the kinematic limit in spite of large standard model backgrounds, unless they are practically mass degenerate with the lightest neutralino. (author) 15 refs., 16 figs., 1 tab.

32173 (LAL–92-06) **Charm particle physics. A Tool-box for QCD.** Roudeau, P. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Feb 1992. 22p. (In French). (CONF-9109424–: 1991 Gif Summer School, Palaiseau (France), Sep 1991). Order Number DE93701157. Source: OSTI; NTIS (US Sales Only); INIS.

The charm quark is the first of heavy quarks and it is produced in hard collisions by disturbing mechanisms. The author shows that the charm particles can be used as probes in the study of QCD perturbation theory, that the study of charm hadron decays can be a good laboratory for studying the contribution of strong interactions to these processes and explains that the charm quark is the only one heavy quark having an electric charge of 2/3 whose the properties can be studied in detail: study of D -antiD oscillations, CP violation, rare mode decays of charm particles.

32174 (LAL–92-07) **Beauty physics-CKM matrix.** Wormser, G. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Feb 1992. 39p. (In French). (CONF-9109424–: 1991 Gif Summer School, Palaiseau (France), Sep 1991). Order Number DE93701158. Source: OSTI; NTIS (US Sales Only); INIS.

This lesson is composed of 3 parts:-Introduction to Cabbibo-Kobayashi-Maskawa matrix and rapid view of beauty particle decays -Measurement of V_{bc} and V_{bu} of this matrix -Measurement of V_{td} and V_{ts}, the oscillation study in B-antiB system.

32175 (LAL–92-15) **Study of Tau lepton decays with ALEPH detector at LEP.** Zhang, Z. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Apr 1992. 201p. (In French, English). Order Number DE93701159. Source: OSTI; NTIS (US Sales Only); INIS.

Using the data accumulated at LEP in 1989 and 1990 with the ALEPH detector, the inclusive and exclusive branching ratios of the τ lepton have been measured assuming lepton universality in Z^0 decays. The inclusive branching fractions for the τ decay into one, three, and five charged particles have been determined to be (85.45±0.97)%, (14.35±0.48)%, and (0.10± 0.05)% respectively, in agreement with the world averages. New undetected decay modes are determined to have a branching fraction of less than 2.1% at 95% CL. The measured branching ratios for quasi-exclusive channels are slightly larger than, but consistent with the world averages, except for the modes $\tau \rightarrow 3$ hadrons$+\nu_\tau$ and $\tau \rightarrow$hadron$+2\pi^0\nu_\tau$, which are significantly larger. These latter branching ratios have been found to be (9.5±0.7)% and (10.2±1.1)%, respectively. The sum of all the measured quasi-exclusive branching ratios is (100.4±1.8)%. A fully exclusive analysis of modes with neutral pions shows no evidence for new photonic decay modes with a branching fraction limit of 3.4% at 95% CL.

32176 (LAPP-EXP–91-09) **Experimental study of charmed baryons at SuperLEAR.** Poulet, M. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. 1991. 7p. (CONF-9110318–: SuperLEAR workshop, Zurich (Switzerland), 9-12 Oct 1991). Order Number DE93703731. Source: OSTI; NTIS (US Sales Only); INIS.

The possibility to study and detect the charmed baryons at SuperLEAR was examined. It was found that it is possible only if the search is restricted to the single charm baryons Λ_c, Σ_c, Ξ_c. The experimental approach requires high luminosity and some complexity of the detection system. It has to be considered as a second generation jet target experiment in a range of p-bar momentum from 8 to 15 GeV/c. (R.P.) 12 refs., 2 figs.

32177 (LNS-PH–91-15) **η,$K_L \rightarrow \pi^+\pi^-\gamma$ as tests of chiral models.** Picciotto, C. (Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1991. 16p. Order Number DE92570125. Source: OSTI; NTIS (US Sales Only); INIS.

The decay $\eta \rightarrow \pi^+\pi^-\gamma$ is analyzed using two recently developed chiral models which incorporate vector mesons. One of the models generates a rate and photon spectrum which give an excellent fit to the experimental data. That model is then used to calculate $K_L \rightarrow \pi^+\pi^-\gamma$, and a rate which matches the experimental one is obtained with reasonable values of SU(3) breaking parameters. (author) 10 refs., 5 figs.

32178 (NIIYaF-MGU–90-37-183) **Restrictions on the fluxes of relativistic cosmic photinos according to neutrino experiment KAMIOKANDE.** Zaslavskaya, E.S.; Naumov, V.A. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1990. 30p. (In Russian). Order Number DE92644949. Source: OSTI; NTIS (US Sales Only); INIS.

The cross sections of massive photino scattering on electron and nucleon are obtained. The flux limits of cosmic origin relativistic photinos for different values of photino and scalar fermion masses are obtained on the basis of underground KAMIOKANDE experiment and calculation of neutrino event number in the detector. 22 refs.; 7 figs.; 1 tab.

32179 (OUP–92-12) **A narrow centrally produced 3π resonance at 1080 MeV/c^2 observed in pp-reactions at 19 GeV/c.** Danielsen, K.M. (Oslo Univ., Fysisk Inst. (Norway)); Jacobsen, T.; Olsen, H.A. Oslo Univ. (Norway). Fysisk Inst. Apr 1992. 17p. Order Number DE93602626. Source: OSTI; NTIS; INIS.

A narrow centrally produced neutral 3π system is seen at about 1080 MeV/c^2 in the reaction $pp \rightarrow pp\pi^+\pi^-\pi^0$ at 19 GeV/c. There is no evidence of $\rho\pi$ in the final state of this system. Charged $\rho\phi$ systems have previously been seen in diffractive processes in this mass region, e.g. the old A_1(1080), though not in pp-reactions. The possibility that the resonance is a spin zero glueball created in gluon gluon resonance scattering is discussed. 11 refs., 9 figs.

32180 (OUP–92-16) **τ physics at LEP.** Dam, M. Oslo Univ. (Norway). Fysisk Inst. May 1992. 15p. Order Number DE93602654. Source: OSTI; NTIS; INIS.

Untill the end of the 1991 data taking period, the four LEP experiments have collected about 80000 $\tau^+\tau^-$ pairs. Many precise measurements of the production and decay properties of the τ lepton at the Z^o resonance have been performed. Accurate measurements of the τ lifetime along with measurements of inclusive and exclusive branching ratios provide interesting consistency tests in τ decays. Measurements from LEP confirm nonzero values of the average polarization of the τ, starting to yield precise measurements of the weak mixing parameter $\sin^2\theta_w$. A test of CP invariance in $\tau^+\tau^-$ production has been performed. 23 refs., 6 tabs.

32181 (SLAC-PUB–4596) **Inclusive charged hadron and K^0 production in two-photon interactions.** Cords, D.; Boyer, J.; Butler, F.; Gidal, G.; Abrams, G.S.; Amidei, D.; Baden, A.R.; Barklow, T.; Boyarski, A.M.; Breidenbach, M.; Burchat, P.R.; Burke, D.L.; Dorfan, J.M.; Feldman, G.J.; Gladney, L.; Gold, M.S.; Goldhaber, G.; Golding, L.J.; Haggerty, J.;.Lawrence Berkeley Lab., CA (United States); Stanford Linear Accelerator Center, Menlo Park, CA (United States); Harvard Univ., Boston, MA (United States). Mar 1988. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515 ;AC03-76SF00098. (LBL–25066;CONF-8804245–3: 8. International workshop on Photon-Photon Collisions, Jerusalem (Israel), 24-28 Apr 1988). Order Number DE92018231. Source: OSTI; NTIS; INIS; GPO Dep.

The analogous process to quark pair production in e^+ e^- annihilation is the hard-scattering quark exchange process in $\gamma\gamma$ interactions. This hard-scattering process is expected to dominate the cross section at high transverse momenta of the produced quarks. Experimentally, one has looked for this process in two-jet as well as inclusive particle production and has found a relatively low PT onset of hard scattering in $\gamma\gamma$ interactions. This report examines the issue in more detail (high statistics) for charged particle inclusive production and checks if the heavier flavors display a similar behavior in inclusive K^0 production.

32182 (SLAC-PUB–4830) **Chiral corrections to the anomalous 2γ decays of π^0, η and η'.** Issler, D. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Nov 1990. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-8808145–35: 4. meeting of the Division of Particles and Fields of the American Physical Society (APS), Storrs, CT (United States), 15-18 Aug 1988). Order Number DE92019365. Source: OSTI; NTIS; INIS; GPO Dep.

To any order in chiral perturbation theory, the anomalous Wess-Zumino term is shown to generate only chirally invariant counterterms. Explicit examples of 0(p_6) terms generated by one-loop graphs are given, some of which are relevant to the two-photon decays of π^0, η and η'.

32183 (SLAC-PUB–5100) **A combined analysis of SLAC experiments on deep inelastic e-p and e-d scattering.** Whitlow, L.W. (Stanford Univ., CA (United States)); Bodek, A.; deBarbaro, P.; Dasu, S.; Harada, H.; Krasny, M.W.; Lang, K.; Riordan, E.M.; Rock, S.; Arnold, R.; Benton, D.; Bosted, P.; Button-Shafer, J.; deChambrier, G.; Clogher, L.; Lung, A.; Szalata, Z.MStanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1989. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (UR–1119;ER–13065-586;CONF-890903–1: International europhysics conference on high-energy physics, Madrid (Spain), 6-14 Sep 1989). Order Number DE92018151. Source: OSTI; NTIS; INIS; GPO Dep.

We report recent work on the extraction of $R = \sigma_L/\sigma_T$ and the structure function F_2 over a large kinematic range, which is based on a reanalysis of deep inelastic $\varepsilon - p$ and $\varepsilon - d$ scattering cross sections measured at SLAC between 1970 and 1985. All these data were corrected for radiative effects using improved versions of external and internal radiative correction procedures. The data from seven individual experiments were normalized to those from the recent high-precision SLAC experiment E140. We find that $R_p = R_d$, as expected in QCD. The value of R is higher than predicted by QCD even when target-mass effects are included. This difference indicates that additional dynamical higher-twist effects may be present. The structure functions F_2p and F_2d were also extracted from the full data sets of normalized cross sections using an empirical fit to R. These structure functions were then compared with data from the CERN muon scattering experiments BCDMS and EMC. We find that our data are consistent with the EMC data, if the latter are multiplied by a normalization factor of 1.07. No single, uniform normalization factor can be applied to the BCDMS data that will bring them into agreement with the SLAC data in the region of overlap.

32184 (SLAC-PUB–5819) **Test of QED using a laser at the SLAC final focus test beam.** Spencer, J.E. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Apr 1992. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9203159–7: 9. international workshop on photon-photon collisions, San Diego, CA (United States), 22-26 Mar 1992). Order Number DE92019647. Source: OSTI; NTIS; INIS; GPO Dep.

Experiment #144 at SLAC has three parts: the search for low-mass states excited in $\gamma\gamma$ collisions and observed in pair decay, the study of nonlinear, nonperturbative QED in γe and $\gamma\gamma$ collisions, and its possible applications to general purpose linear colliders. Such colliders could produce the full range of $J_{q\cdot\bar{q}}/^{PC}$ states, leptoquarks $J_{l\cdot\bar{q}}/^{PC}$, the particles of supersymmetry, the top quark or Higgs. However, to realize them a number of technical problems need resolution that are addressed in E144 together with interesting possibilities for highly polarized, high brightness $\gamma/^{\rightarrow}$ $e^{\rightarrow\pm}$ beams that are needed for electroweak studies.

6624 Properties of Specific Particles and Resonances

Refer also to citation(s) 32122, 32128, 32138, 32144, 32152, 32158, 32181, 32221, 32224, 32274, 32300

32185 (ANL-HEP-CP–92-47) **Probing new gauge boson couplings at hadron.** Rizzo, T.G. (Argonne National Lab., IL (United States)). Argonne National Lab., IL (United States); Ames Lab., IA (United States). Jun 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9206251–1: Physics beyond the standard model III conference, Ottawa (Canada), 22-24 Jun 1992). Order Number DE92018183. Source: OSTI; NTIS; INIS; GPO Dep.

Once it is discovered, the determination of the various couplings of a new neutral gauge boson at a hadron supercollider will not be an easy task. We review several recent studies that have begun to examine this issue for both the SSC and LHC.

32186 (CEA-CONF–10846) **The modification of hadrons propagating in dense media.** Ripka, G. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Sciences de la Matiere. 1991. 6p. (CONF-9109291–: 5. mesons and light nuclei, Prague (Czechoslovakia), 1-6 Sep 1991). Order Number DE92566705. Source: OSTI; NTIS (US Sales Only); INIS.

The polarization of the medium must be distinguished from the modification of the intrinsic structure of hadrons in order to make a meaningful study of the modification of hadrons in dense matter. An unambiguous distinction is attempted in the case where mesons are described by the Nambu Jona-Lasinio model. The variation of the quark constituent mass is related to recent proposals to scale effective lagrangians.

32187 (CEA-LNS-Ph–92-14) **Electroproduction of polarized Λ's.** Kunne, R.A. Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1992. 10p. Order Number DE93701205. Source: OSTI; NTIS (US Sales Only); INIS.

Lambdas are a powerful tool to explore spin effects of QCD. The λ polarization is self analyzing, as it is measurable from the angular distribution of the decay products. Two applications of polarized electroproduced λ's are suggested: the measurement of λ polarization at large transverse momentum as a possible test of QCD and the measurement of transversely polarized parton distributions.

32188 (CONF-920126–4) **The spin of the nucleon in deep inelastic lepton scattering experiments.** Mallot, G.K. (European Organization for Nuclear Research, Geneva (Switzerland). PPE Div.). Yale Univ., New Haven, CT (United States). Dept. of Physics. [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-92ER40704. From 13. international conference on few body problems in physics; Adelaide (Australia); 5-11 Jan 1992. Order Number DE92018854. Source: OSTI; NTIS; INIS; GPO Dep.

The current experimental status of the spin dependent structure functions as measured in polarized deep inelastic scattering of charged leptons from nucleons is reviewed. The proposals for new experiments at CERN, SLAC and HERA are discussed with special emphasis on the experiment of the Spin Muon collaboration at CERN which has started data taking.

32189 (FNAL/C–92/165) **Particle production and survival in muon acceleration.** Noble, R.J. Fermi National Accelerator Lab., Batavia, IL (United States). Jun 1992. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9206193–6: Advanced accelerator concepts workshop, Port Jefferson, NY (United States), 14-20 Jun 1992). Order Number DE92019553. Source: OSTI; NTIS; INIS; GPO Dep.

Because of the relative immunity of muons to synchrotron radiation, the idea of using them instead of electrons as probes in high-energy physics experiments has existed for some time, but applications were limited by the short muon lifetime. The production and survival of an adequate supply of low-emittance muons will determine the available luminosity in a high-energy physics collider. In this paper the production of pions by protons, their decay to muons and the survival of muons during acceleration are studied. Based on a combination of the various efficiencies, the number of protons needed at the pion source for every muon required in the final high-energy collider is estimated.

32190 (IC–92/167) **Detection of charged Higgs bosons through the rare decay $H^+ \rightarrow W^+\gamma$.** Raychaudhuri, S. (International Centre for Theoretical Physics, Trieste (Italy)); Raychaudhuri, A. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 17p. Order Number DE92645054. Source: OSTI; NTIS (US Sales Only); INIS.

The process $H^+ \rightarrow W^+\gamma$ is evaluated exactly in the 't Hooft-Feynman gauge in a two-Higgs doublet model with scalar masses and couplings as in the Minimal Supersymmetric Standard Model. At hadron colliders this rare decay might provide a clean signal for detection of charged Higgs particles lighter than the top quark. (author). 13 refs, 3 figs.

32191 (INIS-mf–14069, pp. 165-169) **Medium effects on quark and meson masses.** Bueckers, D. (Inst. fuer Theoretische Physik, Univ. Tuebingen (Germany)); Muether, H. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

A chiral invariant Lagragian with a momentum dependent quark-quark interaction is used to calculate effective quark masses within a Hartree-Fock mean-field approximation. A system of infinite quark matter is considered to discuss medium effects on quark and meson masses. (orig.).

32192 (INIS-mf–14069, pp. 278-283) **Scaling effects and properties of Δ-isobar resonances.** Ratis, Yu.L. (JINR, Dubna (USSR)); Gareev, F.A. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. N*BARYONS/particle properties; N*BARYONS; NUCLEON-NUCLEON INTERACTIONS; SCALING LAWS; QUARKS; EXCITATION; PION-NUCLEON INTERACTIONS

32193 (IPNO-TH–91-29) **Potential harmonic calculations of the binding energies of bosons and fermions in nuclear physics.** Fabre de la Ripelle, M. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique); Young-Ju Jee; Klemm, A.D.; Larsen, S.Y. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 36p. Order Number DE92570080. Source: OSTI; NTIS (US Sales Only); INIS.

This paper keeps only that part of the hyperspherical basis sufficient to reproduce correctly the 2-body correlations of the wave functions. The resulting formalism is tractable and the authors were able to present results for even numbers of bosons (4,6,8,12,16) and for fermions (Oxygen). Their test potentials are the Afnan-Tang S3 and the Malfliet-Tjon V. The results are discussed and compared with those obtained by different methods. (author) 38 refs., 3 figs., 6 tabs.

32194 (JINR-E–2-91-114) **H^+H^- interaction up to higher orders of perturbation theory in the model with two Higgs doublets (self-energy and vertex diagrams).** Dvoeglazov, V.V. (Saratovskij Gosudarstvennyj Univ., Saratov (Russian Federation)); Skachkov, N.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 26p. Order Number DE92645055. Source: OSTI; NTIS (US Sales Only); INIS.

Self-energy and vertex blocks that enter into the amplitude of Higgs-Higgs-interaction are calculated up to the fourth order of perturbation theory in the framework of the model of electroweak interaction with two Higgs doublets and an arbitrary number of fermions. The renormalization is performed on the mass shell of the physical fields after a spontaneous symmetry breaking. The values of the coupling constants are, as a rule, not concretized in the paper. In the cases where it is needed to use them, their values obtained in the model with the minimal supersymmetric extension of the standard model (MSSM) are taken. 29 refs.; 1 tab.

32195 (JINR-E–2-91-171) **Some new aspects of the unitary and analytic VMD model for electromagnetic structure of hadrons.** Dubnickova, A.Z.; Dubnicka, S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 7p. Order Number DE93602673. Source: OSTI; NTIS (US Sales Only); INIS.

Recent $J/\phi \rightarrow \pi^+\pi^-$ data analyzed along with all existing pion form factor data by means of the unitary and analytic vector dominance model manifest a strong evidence of the third excited state of the $\rho(770)$ meson with resonance parameters $m_{\rho'''}=2169\pm46$ MeV and $\Gamma_{\rho'''}=319\pm136$ MeV. A simultaneous analysis of all reliable proton and neutron form factor data in the space-like region along with data on the total cross section of electron-positron annihilation into a proton-antiproton pair by the same model predicts an unexpected inequality σ_{tot}(e^{e-}+→nn-bar)>>σ_{tot} (e$^+$e$^-$→pp-bar) just above the nucleon-antinucleon threshold and also surprisingly large one-photon electromagnetic corrections to the strong J/ϕ→pp-bar and J/ϕ→nn-bar decay amplitudes. 21 refs.; 5 figs.; 1 tab.

32196 (JINR-E--2-91-180) **Inverse pion electroproduction at high energies- a source of information on the hadron form factors.** Surovtsev, Yu.S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Tkebuchava, F.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 15p. Order Number DE92645036. Source: OSTI; NTIS (US Sales Only); INIS.

Processes γN→$\pi^\pm$N, eN→e$\pi^\pm$N, πN→e$^+$e$^-$N, π^-p→ρ^0n are considered in the framework of the unified dispersive model at high energies and small momentum transfer. A conclusion is drawn on the reduction of the rescattering effects with increasing time-like values of virtual photon ^{m}ass· Thus simple electric Born model for the description of the process of inverse electroproduction (and π^-p→ρ^0n) in indicated kinematic region is grounded and conclusion on the possibility of receiving reliable information on hadron structure from the experimental data on this process is drawn. 27 refs.; 1 fig.

32197 (LAL--91-48) **Searches for new particles at LEP.** Davier, M. Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire. Dec 1991. 28p. (CONF-9107172--: 15. joint international lepton photon symposium at high energies and European Physical Society (EPS) conference on high energy, Geneva (Switzerland), 25 Jul - 1 aug 1991). Order Number DE92570113. Source: OSTI; NTIS (US Sales Only); INIS.

A review of the results from ALEPH, DELPHI, L3, and OPAL on searches for new particles is given. No evidence for a positive signal is seen, but significant and constraining limits are placed. In particular, the Standard Higgs boson must be heavier than 57 GeV and Higgs bosons from the minimal supersymmetric theories are strongly constrained, with the lightest CP-even state heavier than 43 GeV and the CP-odd state heavier than 20 GeV. Precision electroweak measurements of the Z parameters are on the verge of producing Higgs-sensitive results. No indication of compositeness is found for fermions and for the Z^0 boson, and the transition Z → 3γ has to be smaller than 10^{-5} of the total Z rate. Lepton flavour conservation still holds in Z decays at a level of a few 10^{-5}. (author) 67 refs., 41 figs., 9 tabs.

32198 (LAPP-TH--322/90) **Phenomenology of one extra neutral Z.** Verzegnassi, C. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Dec 1990. 17p. (CONF-9010510--: 1. International triangle workshop CERN-IHEP-JINR, Dubna (USSR), 1-5 Oct 1990). Order Number DE92570088. Source: OSTI; NTIS (US Sales Only); INIS.

The main features and limits of present and future indirect searches of one extra neutral Z of general theoretical origin are overviewed. At the end of the LEP and of the pp collider runs, negative searches of a Z' will force this particle to be characterized in general by a high (more than ≈5-6 TeV) mass and by a very low mixing angle in orthodox cases. These negative features might lead to severe restrictions on the candidate models and, possibly, to a deeper theoretical understanding of their origin. (R.P.) 16 refs., 7 figs.

32199 (LAPP-TH--329/91) **Electromagnetic interactions and chirality flip of neutrinos in a thermal background.** Altherr, T. (Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires); Kainulainen, K. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Mar 1991. 9p. Order Number DE92570091. Source: OSTI; NTIS (US Sales Only); INIS.

The finite temperature and density effects on the electromagnetic properties of neutrinos are investigated. For a Standard Model neutrino a left-handed effective charge and a chirality flipping term associated with the longitudinal photon exchange were found. In the supernova the chirality flipping rate was shown to be two orders of magnitude larger than the previous estimates using the vacuum magnetic moment. (author) 16 refs., 1 fig.

32200 (LAPP-TH--343/91) **Higgsometry from Ultimate LEP.** Blondel, A. (Ecole Polytechnique, 91 - Palaiseau (France). Lab. de Physique Nucleaire et des Hautes Energies); Renard, F.M.; Verzegnassi, C. Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires. Jul 1991. 12p. Order Number DE92570095. Source: OSTI; NTIS (US Sales Only); INIS.

The bounds that could be set on the mass of the Standard Model Higgs boson from Electroweak measurements (Γl, M$_W$, A$_{LR}$) and measurement of the top quark mass, at LEP and the Tevatron are analysed. Significant bounds would be obtained (ΔM$_H$/M$_H$≈35%) for the Ultimate LEP configuration, with longitudinal polarization and high luminosity simultaneously available. (author) 17 refs., 2 figs.

32201 (LA-UR--92-1736) **The proton Compton effect: Recent measurements of the electric and magnetic polarizabilities of the proton.** Federspiel, F.J. Los Alamos National Lab., NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9205234--1: The hadron structure workshop, Brookhaven, NY (United States), 28-29 May 1992). Order Number DE92017594. Source: OSTI; NTIS; INIS; GPO Dep.

A review of the experimental situation regarding the electric and magnetic polarizabilities of the proton is presented. The polarizabilities extracted from an analysis of two recent experiments are: $\bar{\alpha}$ = (10.8±1.0±1.0)x10^{ber}4 fm ^{3} and $\bar{\alpha}$=(3.4∓1.0∓1. 0) x 10^4 fm^3.

32202 (LA-UR--92-1768) **Neutrino mass.** Robertson, R.G.H. Los Alamos National Lab., NM (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9204182--1: Franklin symposium, Philadelphia, PA (United States), 29 Apr - 1 may 1992). Order Number DE92017411. Source: OSTI; NTIS; INIS; GPO Dep.

Despite intensive experimental work since the neutrino's existence was proposed by Pauli 60 years ago, and its first observation by Reines and Cowan almost 40 years ago, the neutrino's fundamental properties remain elusive. Among those properties are the masses of the three known flavors, properties under charge conjugation, parity and time-reversal, and static and dynamic electromagnetic moments. Mass is perhaps the most fundamental, as it constrains the other properties. The present status of the search for neutrino mass is briefly reviewed.

6630 Nuclear Physics

Refer also to citation(s) 31430

32203 (CEA-CONF--10845) **Nuclear physics in a swelled world.** Rho, M. CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Sciences de la Matiere. 1991. 15p. (CONF-9109127--: Workshop on baryon spectroscopy and the structure of the nucleon, Saclay (France), 23-25 Sep 1991). Order Number DE92566704. Source: OSTI; NTIS (US Sales Only); INIS.

The notion of swelled world is developed in terms of an effective chiral Lagrangian implemented with conformal (trace) anomaly. It is suggested that nuclear processes be described by a systematic chiral expansion with this Lagrangian. An application is made to the strong enhancement of axial-charge matrix elements observed in heavy nuclei. Possible implications on QCD phase transitions are discussed.

32204 (CNIC--00492) **Communication of nuclear data progress: No.4(1990).** Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 75p. (CNDC--0005;INDC(CPR)--019/L.). Order Number DE93602695. Source: OSTI; NTIS (US Sales Only); INIS.

Communication of Nuclear Data Progress (CNDP) in English is set up by Chinese Nuclear Committee and Chinese Nuclear Data Center (CNDC). This is the fourth issue. It includes measurements of neutron smaee angle scattering cross sections for Fe, Ni and Cr; n-D scattering phase-shift and ^{17}O R-matrix analyses; calculations of neutron elastic and inclastic scattering from ^{7}Li; evaluations of ^{2}H(n,2n), ^{23}Na, ^{59}Co(n, γ), ^{235,238}U, ^{239}Pu(n,f) and

(n, γ) cross sections; and a fitting code of corrected SLBW with multilevel effect (CBNFIT); R-matrix analysis code (RAC) etc.

32205 (DOE/ER/40270–36) **Investigations of the structure and electromagnetic interactions of few-body systems: Progress report, 1 August 1991–31 July 1992.** Lehman, D.R.; Haberzettl, H.; Maximon, L.C.; Parke, W.C. George Washington Univ., Washington, DC (United States). Center for Nuclear Studies. Jul 1992. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-86ER40270. Order Number DE92040011. Source: OSTI; NTIS; INIS; GPO Dep.

In order to make it easy for the reader to see the specific research carried out and the progress made, the following report of progress is done by topic. Each item has a format layout of Topic, Investigators, Objective, Significance, and Description of Progress, followed at the end by the relevant references. As is clear from the topics listed, the emphasis of the George Washington University (GWU) theory group has been on the structure and electromagnetic interactions of few-body nuclei. Both low- and intermediate-energy electromagnetic disintegration of these nuclei is considered. When the excitation energy of the target nucleus is low, the aim has been to handle the continuum part of the theoretical work numerically with no approximations, that is, by means of full three- or four-body dynamics. When structure questions axe the issue, numerically accurate calculations axe always carried through, limited only by the underlying two-body or three-body interactions used as input. Implicit in our work is the question of how far one can go within the traditional nuclear physics framework, i.e., nucleons and mesons in a nonrelativistic setting. Our central goal is to carry through state-of-the-art fewbody calculations that wig serve as a means of determining at what point standard nuclear physics requires quark degrees of freedom in order to understand the phenomena in question. So far, in the problems considered, there has been no evidence of the necessity to go beyond the traditional approach, though we always keep in mind that possibility. As our work is involved with questions in the intermediate-energy realm, moving from a nonrelativistic framework to a relativistic one is always a consideration. Currently, for the problems that have been pursued in this domain of energy, the issues concern far more the mechanisms of the reactions and structural questions than the need to move to relativistic dynamics.

32206 (DOE/ER/40335–13) **Theoretical nuclear physics: Progress report, October 1, 1991–August 1, 1992.** Rost, E.; Shephard, J.R. Colorado Univ., Boulder, CO (United States). Aug 1992. 79p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER40335. Order Number DE92019286. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics: Exact 1-loop vacuum polarization effects in 1 + 1 dimensional QHD; exact 1-fermion loop contributions in 1 + 1 dimensional solitons; exact scalar 1-loop contributions in 1 + 3 dimensions; exact vacuum calculations in a hyper-spherical basis; relativistic nuclear matter with self- consistent correlation energy; consistent RHA-RPA for finite nuclei; transverse response functions in the Δ-resonance region; hadronic matter in a nontopological soliton model; scalar and vector contributions to $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$ reaction; 0+ and 2+ strengths in pion double-charge exchange to double giant-dipole resonances; and nucleons in a hybrid sigma model including a quantized pion field.

32207 (DOE/ER/40561–68) **Institute for Nuclear Theory [annual report]: Program 6, Mesons and fields in nuclei, 30 September 1991–31 January 1992; Program 7, Fundamental interactions in nuclei, 1 February 1992–31 May 1992: Final report.** Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory. [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-90ER40561. Order Number DE92040079. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses mesons and fields in nuclei and fundamental interactions in nuclei. (LSP)

32208 (DOE/ER/40561–68-INT92) **Institute for Nuclear Theory annual report No. 2, 1 March 1991–29 February 1992.** Haxton, W. (Washington Univ., Seattle, WA (United States). Dept. of Physics); Henley, E.M. Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory. [1992]. 145p. Sponsored by US-DOE, Washington, DC (United States); Murdock Charitable Trust (United States). DOE Contract FG06-90ER40561. Order Number DE92040064. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses research on the following topics in Nuclear physics: electromagnetic interactions and few-nucleon systems; N^*'s and nucleon structure; mesons and fields in nuclei; and nuclear astrophysics of type II supernovae. (LSP).

32209 (INP–1467) **Department of Theoretical Physics. Annual Report 1989.** Institute of Nuclear Physics, Cracow (Poland). 1990. 38p. Order Number DE92645067. Source: OSTI; NTIS (US Sales Only); INIS.

Abstracts of studies done in 1989 at the Department of Theoretical Physics of the H. Niewodniczanski Institute of Nuclear Physics in Cracow are given together with the lists of personnel, guests, conference papers, lectures, habilitations, ph.d. theses and publications. 45 refs. (A.S.).

32210 (JAERI-M–92-027) **Proceedings of the 1991 symposium on nuclear data.** Baba, Mamoru (Tokyo Univ. (Japan)); Nakagawa, Tsuneo. Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Japanese Nuclear Data Committee. ©Mar 1992. 406p. Sponsored by Japan Atomic Energy Research Inst., Tokyo (Japan). (CONF-9111211–: 1991 Japan Atomic Energy Research Institute (JAERI) symposium on nuclear data, Tokai (Japan), 28-29 Nov 1991). Order Number DE92012612. Source: OSTI; NTIS (US Sales Only).

The 1991 Symposium on Nuclear data was held at Tokai Research Establishment, Japan Atomic Energy Research Institute (JAERI), on 28th and 29th of November 1991. This symposium was organized by Japanese Nuclear Data Committee and Nuclear Data Center, JAERI. In the oral session, presented were 15 papers on nuclear data activities in Thailand, status reviews of JENDL-3 and its special purpose files, OMEGA program and ESNIT promoted by JAERI and related nuclear data, reviews of nuclear theories, nuclear data in the intermediate energy region, topics on knowledge technology and reactor physics. In the poster session, twenty-three papers were presented, which were related to nuclear data measurements, benchmark tests of evaluated data and evaluation. All of the 38 papers are compiled in the proceedings.

32211 (JAERI-M–92-039) **Proceedings of the specialists' meeting on high energy nuclear data.** Fukahori, Tokio (ed.). Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). ©Mar 1992. 216p. Sponsored by Japan Atomic Energy Research Inst., Tokyo (Japan). (INDC(JPN)–158/L;CONF-9110373–: Specialists' meeting on high energy nuclear data, Tokai (Japan), 3-4 Oct 1991). Order Number DE92012299. Source: OSTI; NTIS (US Sales Only).

This report consists of the Proceedings of the Specialists' Meeting on High Energy Nuclear Data. The meeting was held on October 3–4, 1991, at the Tokai Research Establishment, Japan Atomic Energy Research Institute with the participation of forty-odd specialists, who were the evaluators, theorists, experimentalists and users of high energy nuclear data including the members of Japanese Nuclear Data Committee. The need of the nuclear data in the high energy region up to a few GeV was stressed in the meeting for many applications, such as spallation neutron sources for radioactive waste treatment, accelerator shielding design, medical isotope production, radiation therapy, the effects of space radiation on astronauts and their equipments, and the cosmic history of meteorites and other galactic substances. Although the neutron nuclear data below 20 MeV have been well evaluated for fission and fusion reactor applications, the nuclear data in the high energy region have never been prepared in Japan. With the view of producing an evaluated high energy nuclear data file, theoretical models and codes, available and necessary measurements, needs of nuclear data, and various applications were reviewed and discussed. The consensus, that the wide collaboration was necessary to produce the evaluated file and should be established, has been obtained.

6631 Nuclear Structure

Refer also to citation(s) 32067, 32135, 32136, 32141, 32240, 32242, 32243, 32257, 32281, 32285, 32288, 32289, 32294, 32295, 32296, 32299, 32300, 32301, 32305, 32306, 32315

32212 (ANL/CP–74960) **Evidence for alpha-particle chain configurations in ^{24}Mg.** Wuosmaa, A.H. (Argonne National Lab., IL (United States)); Back, B.B.; Betts, R.R.; Ferre, M.; Gehring, J.; Glagola, P.G.; Happ, Th.; Henderson, D.J.; Wilt, P.; Bearden, I.G. Argonne National Lab., IL (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920708–1: 2. international nuclear physics conference, Wiesbaden (Germany), 26 Jul - 1 aug 1992). Order Number DE92018790. Source: OSTI; NTIS; INIS; GPO Dep.

Many theoretical models have been employed to described the structure of the nucleus ^{24}Mg. Among these are the Cranked Shell model (CSM), the Cranked Cluster Model (CCM), and calculations have also been performed using the Hartree-Fock formalism. One very striking prediction of these calculations is that in this nucleus there exist very unusual configurations, with structures reminiscent of linear chains of alpha particles. In the CSM, for instance, such a configuration is identified with a pronounced minimum in the potential energy energy at very large prolate deformation. In the CCM, several very different alpha-particle duster configurations are identified, many having rather large deformations. These cluster configurations can be associated with the different potential-energy minima obtained in the CSM results. In the case of the CCM, a 6α chain-like configuration is predicted to occur at excitation energies between 40 and 50 MeV, with predicted rotational spacing given by $\hbar^2/2I$=22 keV. At this excitation energy, such a chain configuration would lie well above the threshold for the decay of ^{24}Mg into 6 alpha particles, and its identification poses a difficult experimental challenge. This report discusses this challenge.

32213 (CONF-920721–7) **Study of short-lived rare earth nuclei near the proton drip line.** Toth, K.S. (Oak Ridge National Lab., TN (United States)); Nitschke, J.M.; Wilmarth, P.A.; Sousa, D.C.; Vierinen, K.S. Oak Ridge National Lab., TN (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400 ;AC03-76SF00098. From 6. international conference on nuclei far from stability and 9th international conference on atomic masses and fundamental constants; Bernkastel-Kues (Germany); 19-24 Jul 1992. Order Number DE92019938. Source: OSTI; NTIS; INIS; GPO Dep.

We have investigated the nuclear structure characteristics of neutron-deficient rare earth nuclei near the proton drip line by studying the decay properties of short-lived isotopes produced in bombardments of Ru,Mo, and Nb targets with ^{58}Ni and ^{64}Zn ions extracted from the Lawrence Berkeley Laboratory SuperHILAC. Products of interest were mass separated with the OASIS on-line facility and then assayed with particle and γ-ray detectors. In this contribution we discuss recent results dealing with the decays of ^{145}Dy, ^{155}Lu, and ^{154}Tm.

32214 (CRN-PHTH–91-12) **Towards superdeformation in the quasicontinuum: microscopic view of the excited superdeformed bands and the corresponding level densities.** Werner, T.R.; Dudek, J. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1991. 17p. Order Number DE92570099. Source: OSTI; NTIS (US Sales Only); INIS.

Microscopic calculations of both the normal and the superdeformed rotational bands have been performed for a number of Rare Earth nuclei. The 'universal' Woods-Saxon potential and the extended Strutinsky method have been used. Excited bands up to a prescribed energy limit E* (usually 2.5 to 3.5 MeV) have been calculated individually by minimizing the corresponding nuclear energies over the quadrupole and hexadecapole deformations. This turns out to be essential, when comparing with experimental results for the known discrete bands. An important influence of the superdeformed neutron (N = 86) shell closure on the microscopically calculated rotational-level densities is illustrated and discussed. (author) 11 refs., 4 figs.

32215 (CRN-PHTH–91-19) **Nuclear superdeformation at high spins.** Dudek, J. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires; Strasbourg-1 Univ., 67 (France). 1991. 55p. Order Number DE93701130. Source: OSTI; NTIS (US Sales Only); INIS.

The newly discovered forms of nuclear behavior at exotic shape configurations are discussed from the theoretical point of view. The main emphasis is set on superdeformed nuclei and the strange mechanisms influencing their properties. In particular the feeding properties, alignment, pairing properties and the problem of anomalous degeneracies are discussed.

32216 (ECN-RX–91-050) **European Activation File for fusion: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991.** Kopecky, J. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Gruppelaar, H.; Forrest, R.A. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 21p. (CONF-910503–: International conference on nuclear data for science and technology, Juelich (Germany), 13-17 May 1991). Order Number DE93602702. Source: OSTI; NTIS; INIS.

This paper describes the work performed to revise and extend the European Activation File (EAF). Extensions, revisions and improvements made in the first two versions of the file (EAF-1, EAF-2) are discussed as well as the work which is planned for EAF-3. The EAF-2 file contains cross-sections for all stable and unstable nuclides with half-lifes exceeding 0.5 day. Cross-sections leading to isomeric states are given separately and those isomeric states with $T_{1/2}>0/5$ day are included as targets. The EAF-2 version contains about 11000 reactions on 667 targets. The EAF-2 data file will be further extended and improved and will be supplied with uncertainty information. (author). 30 refs.; 5 figs.; 4 tabs.

32217 (ECN-RX–91-054) **The sensitivity of statistical model capture calculations to model assumptions: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991.** Uhl, M. (Vienna Univ. (Austria). Inst. fuer Radiumforschung und Kernphysik); Kopecky, J. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 5p. (CONF-910503–: International conference on nuclear data for science and technology, Juelich (Germany), 13-17 May 1991). Order Number DE93602703. Source: OSTI; NTIS; INIS.

The most important ingredients of statistical model capture calculations are gamma-ray strength functions f_{XL} for E1 and M1 radiation, level densities and optical potentials. The influence of uncertainties of these quantities was studied with the aim to improve the predictive power of such calculations. Spherical and deformed targets in the mass range A=55-197 were considered. Among different strength function models compatible with independent experimental data the best results were obtained with f_{E1} derived from a 'generalized' Lorentzian and f_{M1} from a standard one. The former is characterized by an energy dependent width and results in a non-zero limit of f_{E1} as the energy tends to zero. A generalization of the energy dependence of the width was required for deformed nuclei with masses between 151 and 175. A marked sensitivity was observed on different level density models with parameters based on the same experimental data. The influence of the neutron optical potential is in general rather weak. (author). 18 refs.; 4 figs.

32218 (GANIL-P–91-22) **Comment on the width and the life-time of multiphonon states.** Chomaz, Ph. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Van Giai, N. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 5p. Order Number DE92570104. Source: OSTI; NTIS (US Sales Only); INIS.

The relation between the width of a multiphonon state and the width of the single phonon is discussed. While it is clear that the inverse of the multiphonon life-time $1/\tau$ is an additive function of the inverse of the phonon life-times $1/\tau_i$, it is pointed out that this is not necessarily true for the width of the multiphonon response function, and that the phonon widths can be quadratically additive. (author) 10 refs.

32219 (GANIL-P–91-24) **From experimental monopole cross-sections to nuclear incompressibilities.** Chomaz, Ph. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen

(France)); Suomijaervi, T.; Van Giai, N.; Treiner, J. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 19p. Order Number DE93703445. Source: OSTI; NTIS (US Sales Only); INIS.

The procedure used to extract strength functions from experimental data is tested. This test is performed on a set of pseudo-data generated from HF and RPA results for monopole resonances in ^{40}Ca, ^{60}Ni, ^{90}Zr and ^{208}Pb. It is shown how the scaling approximation used in the experimental analysis may induce systematic errors. It is demonstrated, however, that whereas the discrepancy on the high energy component can be large, the distortion in the giant monopole resonance region is of the order of 10 to 30% only. Moreover, when ratios of moments are considered, the errors partially compensate one another. The systematic errors on the form factors have little influence on the extracted scaling energy from which nuclear incompressibilities are deduced. (author) 10 refs., 3 figs.

32220 (INIS-mf--14069, pp. 26-32) **Phase-transitions in nuclear matter: Deconfinement of quarks and gluons?.** Rischke, D.H. (Inst. fuer Theoretische Physik der J.W. Goethe Univ., Frankfurt am Main (Germany)); Gorenstein, M.I.; Schaefer, A.; Stoecker, H.; Greiner, W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We investigate lattic data for the thermodynamical functions of the SU (3) pure gauge theory and propose a phenomenological equation of state which is able to reproduce these data. Our results suggest that even at high temperature only gluons with large moments are deconfined, while gluons with small momenta cluster into glueball states. Therefore, the gluon plasma is not an ideal gas of gluons, but rather a 'gluon-cluster' plasma. (orig.).

32221 (INIS-mf--14069, pp. 33-37) **'Local' EMC effects and the J/ψ suppression.** Kumano, S. (Nuclear Theory Center, Indiana Univ., Bloomington, IN (United States)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We investigate a dependence of the 'old' EMC effect on nuclear structure, namely the dependence in the location of the struck quark within a nucleus ('local' EMC effect). Using the rescaling model and the nuclear binding model, we find that scattering from a central or deeply bound constituent gives a larger EMC effect than scattering from a surface or weakly bound constituent. Central and surface gluon distributions, which are important in the J/ψ suppression, are inverstigated by using the parton recombination model and Q^2 rescaling model. We find that such initial condition effects on the J/ψ suppression are of the order of 5-10% and that a calculated p_T slope for the J/ψ is smaller than the observed by NA38. (orig.).

32222 (INIS-mf--14069, pp. 89-93) **Nucleus as a canonical ensemble.** Sato, Hiroshi (Radiation Lab., RIKEN, Wako, Saitama (Japan)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Thermodynamical quantities of the nucleus at both low and high excitation energies studied in terms of temperature dependent antisymmetrized density matrices of many fermions in a harmonic oscillator well. Relationships with the conventional shell model and level density formula are discussed. Extending the method to the deformed nucleus, the Strutinsky type level density distributions are found at low temperature limit. (orig.).

32223 (INIS-mf--14069, pp. 170-177) **Two-loop corrections for nuclear matter in the Walecka model with form factors.** Friedrich, R. (Inst. fuer Kernphysik, Technische Hochschule Darmstadt (Germany)); Wehrberger, K.; Beck, F. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

In the framework of the Walecka model we show that a nucleon-meson form factor can improve the behaviour of two-loop corrections for nuclear matter significantly. The effects of the vacuum fluctuations are strongly suppressed with respect to a calculation without form factors. The main contributions to the energy density are now given by nucleons in the Fermi sea. (orig.).

32224 (INIS-mf--14069, pp. 178-182) **Properties of the ρ-meson in dense nuclear matter.** Herrmann, M. (Gesellschaft fuer Schwerionenforschung (GSI), Darmstadt (Germany)); Friman, B.L.; Noerenberg, W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

The properties of ρ-mesons in dense nuclear matter are studied in a model which satisfies unitarity and current conservation. The important coupling of the ρ-meson to two pions as well as the strong mixing of pions and delta-nuclear-hole states in nuclear matter are included. The ρ-meson self enery in nuclear matter is evaluated with in-medium pion propagators and the corresponding vertex corrections required by current conservation. We find that the ρ-meson width grows drastically with increasing density while its mass remains almost unchanged. (orig.).

32225 (INIS-mf--14069, pp. 183-187) **Coupling and decoupling of pions and deltas in nuclear matter.** Xia Linhua (Physics Dept., Oregon State Univ., Corvallis, OR (United States)); Siemens, P.J.; Soyeur, M. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We implement the delta-hole model for pions in nuclear matter, including self-consistent real and imaginary self energies for both pions and deltas via dispersion relations cut off by form factors. The real part of the pion inverse propagator vanishes at only one energy for each momentum, unlike the conventional picture of level mixing and level repulsion, because of the width of the delta-hole excitation. Results agree with experiments on baryonic charge-exchange reactions and photo-absorption by heavy nuclei. (orig.).

32226 (INIS-mf--14069, pp. 188-192) **Modifications of scalar and vector mesons in nuclear matter.** Mull, V. (Inst. fuer Kernphysik, KFA Juelich (Germany)); Wambach, J.; Speth, J. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195--: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Starting from the realistic dynamical model for the $\pi\pi$ interaction recently developped by the Juelich group, we study the modifications of the scalar-isoscalar and vector-isovector mesons occuring as resonances in 2π scattering in nuclear matter due to charges of the pion dispersion relation. (orig.).

32227 (INIS-mf–14069, pp. 216-219) **Kaon condensation in dense hadronic matter.** Davidson, N.J. (Dept. of Physics, Univ. of Pretoria (South Africa)); Miller, H.G.; Ritchie, R.A.; Von Oertzen, D.W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. NUCLEAR MATTER/kaons; HADRONS; KAONS; HEAVY ION REACTIONS; PARTICLE PRODUCTION; STRANGENESS; THERMODYNAMIC MODEL; RELATIVISTIC RANGE; DENSITY; QUARK MATTER

32228 (IPNO-DRE–91-23) **Investigation of very neutron rich isotopes towards ^{78}Ni: why and how.** Bernas, M. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Czajkowski, S.; Dessagne, P.; Miehe, Ch.; Pujol, C.; Armbruster, P.; Faust, H.; Geissel, H.; Kozhuharov, C.; Munzenberg, G.; Vieira, D. FRS Collaboration. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 8p. (CONF-9106107–: International conference on new nuclear physics with advanced techniques, Ierapetra (Greece), 23-29 Jun 1991). Order Number DE92570065. Source: OSTI; NTIS (US Sales Only); INIS.

Investigations related to very neutron rich isotopes in the region of Ni are reported. These studies are relevant for understanding a new region of double magicity, and they are required to reproduce element abundances in the solar system. A method was developed to measure half lives for very low fragment counting rates. The results obtained with thermal fission are reported and discussed. The next experimental step at GSI using projectile fragments of the SIS ^{86}Kr beam separated by the FRS is presented. (author) 8 refs., 4 figs., 1 tab.

32229 (IPNO-TH–90-73) **Nuclear physics of hot dense matter.** Vautherin, D. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Mar 1991. 60p. Order Number DE92570073. Source: OSTI; NTIS (US Sales Only); INIS.

The equation of state of hot dense matter is an essential ingredient to describe the gravitational contraction of massive stars. Some of the nuclear physics problems occurring in the determination of the equation of state of hot dense matter are discussed. This particularly rich domain of nuclear physics deals with very unusual nuclei, whose mass numbers can be sometimes as large as a thousand, whose existence becomes possible in dense matter because of the screening of Coulomb forces. A calculation of the properties of hot nuclear matter in the mean field approximation is presented. It is shown that a useful approximation to study the phase equilibrium equations is to consider low temperature expansions for the nucleus expansions for the vapor. A simple formula is derived for the limiting temperature T_L beyond which nuclei no longer exist. The equation of state is discussed at subnuclear density and in the domain densities greater than the nuclear saturation density. The standard methods of non relativistic many-body theory as well as relativistic mean-field and Dirac-Brueckner approaches are also discussed. (K.A.) 70 refs., 9 figs.

32230 (IPNO-TH–91-14) **Response functions for infinite fermion systems with velocity dependent interactions.** Garcia-Recio, C. (Granada Univ. (Spain). Dept. de Fisica); Salcedo, L.L.; Navarro, J.; Nguyen Van Giai. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 5 Mar 1991. 71p. Order Number DE92570076. Source: OSTI; NTIS (US Sales Only); INIS.

Response functions of infinite Fermi systems are studied in the framework of the self-consistent Random Phase Approximation. Starting from an effective interaction with velocity and density dependence, or equivalently from a local energy density functional, algebraic expressions for the RPA response function are derived. Simple formulae for the energy-weighted and polarizability sum rules are obtained. The method is illustrated by applications to nuclear matter and liquid ^{3}He. In nuclear matter, it is shown that existing Skyrme interactions give spin-isospin response functions close to those calculated with finite range interactions. The different renormalization of longitudinal and transverse Coulomb sum rules in nuclear matter is discussed. In ^{3}He, the low-lying collective spin oscillation can be well described in a wide range of momenta with a Skyrme-type interaction if the relevant Landau parameters are fitted. For the high-lying density oscillation, the introduction of a finite range term in the energy functional improves considerably the agreement with the data. (author) 54 refs., 19 figs., 4 tabs.

32231 (IPNO-TH–91-41) **The integrodifferential equation approach compared with Shell Model calculations on the ^{4}He nucleus.** Adam, R.M. (University of South Africa (UNISA), Pretoria (South Africa). Dept. of Physics); Fiedeldey, H.; Sofianos, S.A.; Fabre de la Ripelle, M. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 11p. Order Number DE92570082. Source: OSTI; NTIS (US Sales Only); INIS.

For the ^{4}He ground state and effective potentials the Integrodifferential Equation Approach (IDEA) is shown to produce binding energies which are more accurate than those calculated using an Harmonic Oscillator Shell Model basis and requires little numerical effort. This is because the IDEA employs the Potential Harmonic (PH) basis which is complete for two-body correlations generated by a two-body force, requiring only the solution of a two-variable integrodifferential equation of the Faddeev type. It can also easily be extended to larger nuclei with no additional effort and to realistic forces for ^{4}He. (author) 18 refs., 1 tab.

32232 (ISN–91-28) **The surface compression of nuclei in relativistic mean-field approach.** Sharma, M.M. Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires. 1991. 8p. (CONF-910135–: 7. winter workshop on nuclear dynamics, Key West, FL (United States), 27 Jan - 2 feb 1991). Order Number DE92570086. Source: OSTI; NTIS (US Sales Only); INIS.

The surface compression properties of nuclei have been studied in the framework of the relativistic non-linear σ-ω model. Using the Thomas-Fermi approximation for semi-infinite nuclear matter, it is shown that by varying the σ-meson mass one can change the surface compression as relative to the bulk compression. This fact is in contrast with the known properties of the phenomenological Skyrme interactions, where the ratio of the surface to the bulk incompressibility ($-K_S/K_V$) is nearly 1 in the scaling mode of compression. The results suggest that the relativistic mean-field model may provide an interaction with the essential ingredients different from those of the Skyrme interactions. (author) 23 refs., 2 figs., 1 tab.

32233 (JINR-E–2-91-150) **Hadronization of highly virtual quarks in nuclei.** Kopeliovich, B.Z.; Nemchik, J. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 10p. Order Number DE92645069. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that bremsstrahlung by highly virtual quark causes a strong Q^2-dependence of retarding force on the contrary to orthodoxal colour-string model. As the result the length of hadron formation is considerably contracted. Leading hadrons originated from hadronization of a high-energy and highly virtual quark do not attenuate in nuclear matter due to effect of colour transparency. Predictions for deep ineslatic scattering and particle production with high transverse momenta on nuclei are made. 23 refs.

32234 (JINR-E–7-91-149) **New mass measurements of neutron-rich nuclei near N=20*.** Orr, N.A. (Michigan State Univ., East Lansing, MI (United States)); Mittig, W.; Fifield, L.K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1991. 8p. Order Number DE93602706. Source: OSTI; NTIS (US Sales Only); INIS.

The masses of 39 neutron-rich nuclei in the mass range 17 to 37 have been measured using a direct time-of-flight technique following the fragmentation of a ^{48}Ca beam at 55 MeV/nucleon. The masses of $^{29'30}$Ne, $^{34'35}$Mg and $^{36'37}$Al are reported for the first time. The very neutron-rich nuclei, $^{31-33}$Na, are found to be 2-4 MeV less bound than previously believed. Comparison is made with recently available large scale shell model calculations encompassing the deformed A≈32 nuclei. Conclusions are drawn regarding the extent of the region of deformation, which is found to include ^{30}Ne. 33 refs.; 3 figs.; 1 tab.

32235 (JINR-N–2-48-91, pp. 21-28) **Clusters in the nuclear model of chiral field solitons.** Nikolaeva, R.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Nikolaev, V.A.; Tkachev, O.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. In *JINR rapid communications: Collection.* 45p. Order Number DE93000805. Source: OSTI; NTIS (US Sales Only); INIS.

Within a variational approach to the Skyrme model the structure of the 4 and 6-baryon system is investigated. The calculated configurations of α-particle-like type appear to exist in an excited state in the structure of the 6-baryon system. 17 refs.; 2 figs.; 2 tabs.

32236 (JINR-R–4-91-167) **The isoscalar 4^- and 5^- giant resonances in spherical nuclei.** Bastrukov, S.I. (Saratovskij Gosudarstvennyj Univ., Saratov (Russian Federation)); Molodtsova, I.V.; Bobryshev, M.L.; Papykin, A.V.; Bal'butsev, E.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 12p. (In Russian). Order Number DE92645070. Source: OSTI; NTIS (US Sales Only); INIS.

The dynamical equations for the Wigner function in the phase space up to the five order moments are derived. They are solved in the small amplitude of harmonic oscillation approximation. The energies and excitation probabilities of 4^- and 5^-resonances are calculated. 19 refs.; 2 figs.

32237 (JINR-R–4-91-170) **Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes.** Mikhajlov, I.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics); Usmanov, P.N.; Okhunov, A.A.; Brianson, Sh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 15p. (In Russian). Order Number DE93602707. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Izv. Akad. Nauk SSSR, Ser. Fiz.

The Coriolis mixture of the ground, β-, γ-vibrational and $K^{\pi}=1^+$-bands of $^{156'158'160'162'164}$Dy isotopes is analyzed within a phenomenological model. The nonadiabaticities of quadrupole electric transitions from the γ-band are investigated. The values of the B(E2)-probability of transitions from the states of $K^{\pi}=1^+$ bands and the coefficients of mixture of multipoles $\delta(1^+1 \to 2^+0_{gr})$ are estimated by using the experimental data of the E2-transitions from the low-lying states. 19 refs.; 2 figs.; 5 tabs.

32238 (OUP–92-07) **Oscillator strengths for transition among low-lying quartet terms in the nitrogen isoelectronic sequence.** Andersen, J.O.; Aashamar, K. Oslo Univ. (Norway). Fysisk Inst. Mar 1992. 21p. Order Number DE92645071. Source: OSTI; NTIS; INIS.

The authors have calculated energies and transition rates for the $2p^{34}S^o$ ground state and a number of exited states in the isoelectronic sequence of atomic nitrogen using the Multiconfiguration optimized potential model. The exited states include the $3s^4P$, $2s2p^{44}P$, $3p^4D^o$, $3p^4P^o$, $3p^4S^o$, $3d^4F$, $3d^4D$ and $3d^4P$ terms. The oscillator strengths for transitions among these terms have been calculated in both length and velocity gauge. Particular emphasis has been put on an accurate description near level crossings. Comparison with other theoretical and experimental results are made. However, the experimental data are rather sparse, and verification of many of the calculated trends against experiment is therefore not yet possible. 24 refs., 5 figs., 10 tabs.

32239 (OUP–92-22) **Perturbative many-body approaches to finite nuclei.** Hjort-Jensen, M.; Engeland, T.; Holt, A.; Osnes, E. Oslo Univ. (Norway). Fysisk Inst. Jun 1992. 42p. Order Number DE93602740. Source: OSTI; NTIS; INIS.

In this work the authors discuss various approaches to the effective interaction appropriate for finite nuclei. The methods reviewed are the folded-diagram method of Kuo and co-workers and the summation of the folded diagrams as advocated by Lee and Suzuki. Examples of applications to sd-shell nuclei from previous works are discussed together with hitherto unpublished results for nuclei in pf-shell. Since the method of Lee and Suzuki is found to yield the best converged results, this method is applied to calculate the effective interaction for nuclei in the pf-shell. For the calculation of the effective interaction, three recent versions of the Bonn meson-exchange potential model have been used. These versions are fitted to the same set of data and differ only in the strength of the tensor force. The importance of the latter for finite nuclei is discussed. 67 refs., 17 figs., 7 tabs.

6632 Radioactivity and Electromagnetic Transitions (Excluding Fission)

Refer also to citation(s) 32213, 32272

32240 (ANL/CP–76821) **Gamma spectroscopy of multiple nucleon transfer reactions in Sn.** Grabowski, Z.W. (Purdue Univ., Lafayette, IN (United States)); Mayer, R.H.; Fornal, B.; Nisius, D.T.; Bearden, I.G.; Daly, P.J.; Broda, R.; Carpenter, M.P.; Janssens, R.V.F.; Khoo, T.L.; Lauritsen, T. Argonne National Lab., IL (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38 ;FG02-87ER40346. (CONF-920683–2: 2. international symposium on nuclear excited states, Lodz (Poland), 22-26 Jun 1992). Order Number DE92019673. Source: OSTI; NTIS; INIS; GPO Dep.

The decay of $(\pi h_{11/2})^n$ yrast isomers was studied in a series of proton-rich N = 82 isotones culminating in determination of B(E2) values in ^{153}Lu and ^{154}Hf. In the N = 82 isotones however, it seems unlikely that the measurements could be extended beyond ^{154}Hf (n = 8). The opportunity to investigate the $(h^{11/2})^n)$ isomers across the whole $h_{11/2}$ subshell exists, at least in principle, in Sn isotopes where the counterpart $\nu h_{11/2}$ subshell is being filled with neutrons starting at ^{116}Sn. Before our measurements were initiated, the $(\nu h_{11/2})^n$ 10^+ isomers were known to exist in ^{116,118,120}Sn, where the $\nu h_{11/2}$ subshell begins to fill, and in ^{128,130}Sn at the other end. Important information, however, was missing about the 10^+ isomers in ^{122,124,126}Sn where the long lifetimes are expected. The $\upsilon = 3$ $(h_{11/2})$ isomers in odd tin isomers for $A \geq 119$ were also not identified. A serious experimental difficulty in populating high spin states in heavier Sn isotopes is that they are not accessible by fusion-evaporation reactions. We decided to search for these missing tin isotopes among the products of heavy ion reactions on ^{122,124}Sn targets. Using this approach we were able to identify the isomeric decays and measure the lifetimes of the $(\nu h_{11/2}{}^n)$ $\upsilon = 2$ isomeric states in ^{122,124}Sn. In odd tin isotopes we identified new $I = 19/2^+$ yrast isomers in ^{119,121,123}Sn and measured their lifetimes. In addition $(\nu h_{11/2})^n$ $\upsilon = 3$, $I = 27/2^-$ isomers in ^{119,121}Sn were observed for the first time.

32241 (CNIC–00371) **A search for neutrinoless double beta decay of ^{48}Ca.** You Ke (Academia Sinica, Beijing, BJ (China). Inst. of High Energy Physics); Zhao Wenheng; Zhu Yucan. China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 7p. (In Chinese). (BIHEP–0015.). Order Number DE93602758. Source: OSTI; NTIS (US Sales Only); INIS.

A search for neutrinoless double beta decay of ^{48}Ca is being carried out in a coal mine near Beijing. Large scintillation crystals of natural CaF_2 are used as both the detector and the beta source. Results obtained after the first 1700 hours data taken give 3.6 x 10^{21} years as the lower limit of the half-life of the neutrinoless double beta decay of ^{48}Ca. The upper limit of effective neutrino mass calculated according to the theoretical half-life by Qing Chengrui et al is less than 13.7 eV. The experiment is still in progressing.

32242 (CONF-9110236–8) **Electromagnetic properties of ^{181}Ir: Evidence of β-stretching?.** Garg, U. (Notre Dame Univ., IN (United States). Dept. of Physics); Reviol, W.; Semmes, P. Tennessee Technological Univ., Cookeville, TN (United States). Dept. of Physics. [1991]. 5p. Sponsored by USDOE, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract FG05-92ER40694. Grant PHY 91-00688. From Working group 3 Joint Coordinating Committee on Nuclear Reactor Safety (JCCNRS) meeting; Oak Ridge, TN

(United States); 16-18 Oct 1991. Order Number DE92019755. Source: OSTI; NTIS; INIS; GPO Dep.

We have calculated the B(MI)/B(E2) ratios in ^{181}Ir within a shape-fixed particle + rotor model, in order to investigate how sensitive these may be to the nuclear shapes under consideration, and whether or not there is evidence of shape coexistence in the electromagnetic data alone. The model calculations employed the same Woods-Saxon potential that has been used previously for TRS and bandhead calculations and all parameters have been taken at their standard values, without any adjustments. To the extent possible with present models, these calculations should represent predictions for the B(M1)/B(E2) ratios at the deformations expected from the TRS and bandhead calculations. A comparison with the ^{181}Ir data is stimulated by the fact that this is the lightest-mass Ir nucleus for which the spins and parities am firmly established experimentally; we find that the electromagnetic transition rates in this nucleus are well reproduced under the assumption of a single, fixed shape.

32243 (CONF-9205108–12) **Lifetimes of the low spin states in the superdeformed band of ^{192}Hg.** Lee, I.Y. (Oak Ridge National Lab., TN (United States)); Baktash, C.; Cullen, D.; Garrett, J.D.; Johnson, N.R.; McGowan, F.K.; Winchell, D.F.; Yu, C.H. Oak Ridge National Lab., TN (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400 ;FG05-87ER40361. From International conference on nuclear structure at high angular momentum; Ottawa (Canada); 18-21 May 1992. Order Number DE92019177. Source: OSTI; NTIS; INIS; GPO Dep.

Superdeformed (SD) states with a 2:1 axis ratio have been observed in nuclei in the A = 150, 190, and the actinide regions. These states depopulate into normally deformed (ND) states by gamma decay, but so far the linking transitions have not been observed and the depopulation mechanism is not fully understood. Nuclei in different mass regions decay out at states with different spin (I), excitation energy above the ND yrast line (U) and lifetime (τ). This variation is due to differences in the nuclear properties such as the barrier penetration probability, the level densities and the gamma transition strength of SD and ND states. One important factor is the competition between the collective E2 decay along the SD band and the statistical decay to the ND states. These transition rates, or the partial lifetimes, can be determined if the lifetime and the intensity of the gamma rays depopulating the SD states are known.

32244 (CONF-920721–8) **The α-decay properties of light uranium isotopes.** Toth, K.S. (Oak Ridge National Lab., TN (United States)); Kim, H.J.; McConnell, J.W.; Bingham, C.R.; Sousa, D.C. Oak Ridge National Lab., TN (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400 ;FG05-87ER40361. From 6. international conference on nuclei far from stability and 9th international conference on atomic masses and fundamental constants; Bernkastel-Kues (Germany); 19-24 Jul 1992. Order Number DE92019937. Source: OSTI; NTIS; INIS; GPO Dep.

With the use of a velocity filter, the α-particle decays of ^{224}U and ^{225}U were studied in ^{19}F bombardments of ^{209}Bi. Product recoils, after being separated from the incident ^{19}F ions, were implanted into a Si(Au) detector and their subsequent α-decay events recorded together with a time signal for half-life determinations. Data obtained for these two uranium isotopes are compared with those of previous investigators.

32245 (CONF-920721–9) **Lifetime measurements in ^{118,120}Xe.** Mantica, P.F. (UNISOR, Oak Ridge, TN (United States)); Carter, H.K.; Joshi, P.K.; Zganjar, E.F.; Rupnik, D.; Robinson, S.J.; Gill, R.L.; Walters, W.B. Oak Ridge National Lab., TN (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400 ;FG05-88ER40418 ;FG05-84ER40159 ;AS05-76ER03346 ;FG05-87ER40361 ;AC05-76OR00033 ;AC02-76CH00016 ;FG From 6. international conference on nuclei far from stability and 9th international conference on atomic masses and fundamental constants; Bernkastel-Kues (Germany); 19-24 Jul 1992. Order Number DE92040024. Source: OSTI; NTIS; INIS; GPO Dep.

Using the picosecond lifetime system at UNISOR, we have measured the lifetimes for the first 2^+ levels in ^{118,120}Xe to be 64±4 ps and 63±6 ps, respectively. The resulting $B(E2;O_1{}^+ \rightarrow 2_1{}^+)$ value for ^{120}Xe of 1.79±11 e^2b^2 implies there is no saturation of B(E2) values at mid-shell in the Xe isotopes, as suggests from earlier lifetime measurements.

32246 (DOE/ER/40553–3) **Nuclear transparency and double beta decay of molybdenum 100: Annual progress report, March 1, 1992–January 31, 1993.** Nicholson, H.W. Mount Holyoke Coll., South Hadley, MA (United States). Aug 1992. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER40553. Order Number DE92019519. Source: OSTI; NTIS; INIS; GPO Dep.

Data taking is now complete on a double beta decay experiment which has been carried out with collaborators from the Lawrence Berkeley Laboratory, the University of New Mexico, and the Idaho National Engineering Laboratory, and work is continuing on a second collaborative experiment, AGS experiment 850 at the Brookhaven National Laboratory to study nuclear color transparency. In March, the experimental apparatus used to search for double beta decay in molybdenum 100 in the Consil silver mine in Osburn, Idaho was dismantled, and the data analysis is in its final stages. No evidence has been seen for the $O^+ \rightarrow O^+$ mode of zero neutrino double beta decay collaborators with a 1σ lifetime limit of 3×10^{22} years. This limit is 7.5 times greater than the limit we published previously in Physical Review Letters in 1989. Backgrounds have been simulated and fits are currently underway to a simulated $O^+ \rightarrow 2^+$ mode of zero neutrino double beta decay to improve on a very preliminary 1σ lifetime limit of 2.3×10^{21} years presented at the April, 1992 meeting of the APS in Washington. A scintillating fiber detector with three Hamamatsu, H4140, 256 channel multianode phototubes has been built, instrumented, and tested in the May–July 1992 run in the EVA detector at Brookhaven Laboratory's AGS. Preliminary results from this detector have been disappointing. it is likely that the detector will have to be substantially redesigned before the 1993 AGS run.

32247 (GANIL-P–91-19) **Electromagnetic decay of two-phonon states.** Catara, F. (Istituto Nazionale di Fisica Nucleare, Catania (Italy)); Chomaz, Ph.; Van Giai, N. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 11p. Order Number DE92570072. Source: OSTI; NTIS (US Sales Only); INIS.

The electromagnetic decay of two-phonon states corresponding to the multi-excitation of giant resonances is studied. The calculations are performed within a boson expansion approach and the elementary modes are constructed in random phase approximation (RPA). The rates for direct transition of two-phonon states to the ground state turn out to be not negligibly smaller than those from the (single) giant resonances. The former transitions are accompanied by a γ-ray whose energy is equal to the sum of the two phonon energies. Thus the detection of such high energy γ-rays could provide a signature of the excitation of two-phonon states. (author) 9 refs., 3 tabs.

32248 (IPNO-DRE–91-10) **Fine structures in ^{14}C emission of ^{223}Ra and ^{224}Ra.** Hourani, E. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Rosier, L.; Berrier-Ronsin, G.; Elayi, A.; Mueller, A.C.; Rappenecker, G.; Rotbard, G.; Renou, G.; Liebe, A.; Stab, L.; Ravn, H.L. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 30p. Order Number DE92570058. Source: OSTI; NTIS (US Sales Only); INIS.

The measurement of the energy spectrum of ^{14}C nuclei emitted in the spontaneous radioactivity from ^{223}Ra and ^{224}Ra has been carried out, using thin and intense sources (480 MBq for ^{223}Ra and 3550 MBq for ^{224}Ra). The sources were obtained by implanting mass-separated beams from ISOLDE (CERN) into Al and vitreous C catchers. The measurement was performed with the supraconducting solenoidal spectrometer SOLENO installed at Orsay. The discovery, of a fine structure in the energy spectrum of ^{14}C emission from ^{223}Ra, which is analogous to the one known for α emission, is confirmed. Only 13% of the branching ratio in ^{14}C decay leads to the ground state of the residual nucleus, while 81% to the first excited state. For ^{14}C emission of ^{224}Ra, a lower limit of 2 for the hindrance factor has been measured for the transition to the first excited state in the residual nucleus. Also, a precise identification in Z with a E·ΔE telescope has been performed for the radiation from the ^{223}Ra source. (author) 22 refs., 11 figs., 1 tab.

32249 (JINR-D–6-91-199) **Investigation of β-ν angular correlation in decay of ^{24}Na nuclei.** Egorov, V.G. (and others); Brudanin, V.B.; Vorobel, V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 16p. Order Number DE92645115. Source: OSTI; NTIS (US Sales Only); INIS.

The method and results of beta-neutrino angular correlation measurement in β decay of ^{24}Na nuclei are described. The method consists in the γ-energy Doppler shift determination, cascading γ-quanta being registered by Ge(Li) detector in coincidence with β particles at the angles of 0 deg and 180 deg. An upper limit on the Fermi impurity $(M_F)^2/(M_{GT})^2 \leq 0.25$ has been obtained. The model of recoil-ions slowing-down at recoil energies comparable with the binding energy in the crystal-lattice nod is developed. 37 refs.; 8 figs.; 2 tabs.

32250 (JINR-E–4-91-169) **Description of the Gamow-Teller β^+-decays and (n,p) transitions in spherical nuclei.** Kuz'min, V.A.; Solov'ev, V.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 6p. Order Number DE92645116. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Czech. J. PHys.

The results of calculation of the total log(ft)-quantities for decays of neutron-deficit nuclei and strength functions of (n,p) transitions are presented. It is shown that in spherical nuclei the $g_A/g_V \leq 1.0$ conditions fulfilled for the constants of a weak interaction. 17 refs.; 1 fig.; 2 tabs.

32251 (LA-UR–92-2268) **Radioactivities induced in some LDEF samples.** Reedy, R.C.; Moss, C.E.; Bobias, S.G.; Masarik, J. Los Alamos National Lab., NM (United States). [1992]. 12p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206240–1: 2. LDEF post-retrieval symposium, San Diego, CA (United States), 1-5 Jun 1992). Order Number DE92018373. Source: OSTI; NTIS; GPO Dep.

Radioactivities induced in several LDEF samples were measured by low-level counting at Los Alamos and elsewhere. These radionuclides have activities similar to those observed in meteorites and lunar samples. Some trends were observed in these measurements in terms of profiles in trunnion layers and as a function of radionuclide half-life. Several existing computer codes were used to model the production by the protons trapped in the Earth's radiation belts and by the galactic cosmic rays of some of these radionuclides, ^{54}Mn and ^{57}Co in steel, ^{46}Sc in titanium, and ^{22}Na in alloys of titanium and aluminum. Production rates were also calculated for radionuclides possibly implanted in LDEF, ^{7}Be, ^{10}Be, and ^{14} C. Enhanced concentrations of induced isotopes in the surfaces of trunnion sections relative to their concentrations in the center are caused by the lower-energy protons in the trapped radiation. Secondary neutrons made by high-energy trapped protons and by galactic cosmic rays produce much of the observed radioactivities, especially deep in an object. Comparisons of the observed to calculated activities of several radionuclides with different half-lives indicate that the flux of trapped protons at LDEF decreased significantly at the end of the mission.

6633 Nuclear Reactions and Scattering, General

Refer also to citation(s) 31454, 31637, 32059, 32060, 32298, 32309

32252 (GANIL-P–91-16) **Finite size effects in the intermittency analysis of the fragment-size correlations.** Bozek, P. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Ploszajczak, M.; Tucholski, A. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1991. 18p. Order Number DE92570103. Source: OSTI; NTIS (US Sales Only); INIS.

An influence of the finite size effect on the fragment-size correlations in the nuclear multifragmentation is studied using the method of scaled factorial moments for a 1 - dim percolation model and for a statistical model of the fragmentation process, which for a certain value of a tuning parameter yields the power-law behaviour of the fragment-size distribution. It is shown that the statistical models of this type contain only repulsive correlations due to the conservation laws. The comparison of the results with those obtained in the non-critical 1 - dim percolation and in the 3 - dim percolation at around the critical point is presented. Correlations in the 1 - dim percolation model are analysed analytically and the mechanism of the attractive correlations in 1 - dim and 3 - dim is identified. (author) 30 refs., 7 figs.

32253 (GANIL-P–92-05) **Hard photon intensity interferometry in heavy ion reactions.** Ostendorf, R. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Schutz, Y.; Merrouch, R.; Lefevre, F.; Delagrange, H.; Mittig, W.; Berg, F.D.; Kuehn, W.; Metag, V.; Novotny, R.; Pfeiffer, M.; Boonstra, A.L.; Loehner, H.; Venema, L.B.Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). 1992. 12p. (CONF-920117–: 15. nuclear physics symposium, Oaxtepec (Mexico), 7-10 Jan 1992). Order Number DE93703439. Source: OSTI; NTIS (US Sales Only); INIS.

The production of photons in heavy ion collisions is considered. As their experience only the weak and electromagnetic interactions, they transmit an undistorted view of the collision zone. The goal of the present work is to measure the extent of this zone. This is done in an interferometry experiment where photons emitted from a chaotic source generate a correlation pattern related to the source size. (K.A.) 6 refs., 7 figs.

32254 (INIS-mf–14069, pp. 62-66) **Inclusion of fluctuations in BUU nuclear dynamics.** Randrup, J. (Gesellschaft fuer Schwerionenforschung, Darmstadt (Germany)); Burgio, G.F.; Chomaz, P. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. NUCLEAR REACTION KINETICS/fluctuations; FLUCTUATIONS; PHASE SPACE; STATISTICAL MODELS; STOCHASTIC PROCESSES; HEAVY ION REACTIONS; SPALLATION; TWO-BODY PROBLEM; LANGEVIN EQUATION

32255 (INIS-mf–14069, pp. 121-125) **Relativistic transport equations from quantum field theory.** Mrowczynski, S. (High-Energy Dept., Soltan Inst. for Nuclear Studies, Warsaw (Poland)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

A method to derive relativistic transport equations from the quantum filed theory is briefly presented. (orig.).

32256 (INIS-mf–14069, pp. 220-235) **Analysis of discrete ambiguities for π N Δ and ρN Δ vertex functions using inclusive charge-exchange reactions.** Gareev, F.A. (JINR, Dubna (USSR)); Ratis, Yu.L.; Korovin, P.P.; Strokovsky, E.A.; Vaagen, J.S. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We use the formalism of Feynman diagrams to describe the charge-exchange reactions (p,n), (n,p) and (^{3}H e,t) on a free proton target taking into account spectator and decay modes in the $\pi + \rho +$ g'-model. The type of interference between these modes depends on the set of vertex function parameters used. It is shown that discrete ambiguities exist for the $\pi N\Delta$ and $\rho N\Delta$ vertex functions. These are partly resolved if charge-exchange data for a wide energy range is used. (orig.).

32257 (INIS-mf–14069, pp. 262-267) **Pauli blocking and dynamical multifragmentation calculations.** Nemeth, J. (Lab. National Saturne, 91 - Gif-sur-Yvette (France)); Ngo, C.; Paula, L. de; Ngo, H. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. SPALLATION/nuclear reaction kinetics; SPALLATION; PAULI PRINCIPLE; HEAVY ION REACTIONS; CALCULATION METHODS; CROSS SECTIONS; NUCLEON-NUCLEON INTERACTIONS; NUCLEAR FRAGMENTS; ATOMIC NUMBER

32258 (INIS-mf–14069, pp. 268-272) **Surface multifragmentation investigated with a finite temperature spherical TDHF model.** Ngo, H. (Div. de Physique Theorique, Inst. de Physique Nucleaire, 91 - Orsay (France)); Ighezou, F.Z.; Ngo, C.; Nemeth, J.; Paula, L. de. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. SPALLATION/nuclear reaction kinetics; SPALLATION; HEAVY ION REACTIONS; BREAKUP REACTIONS; NUCLEAR FRAGMENTS; NUCLEAR TEMPERATURE; NUCLEAR MATTER; MEAN-FIELD THEORY; HARTREE-FOCK METHOD; TIME DEPENDENCE

32259 (IPNO–1990/1) **Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.** Didelez, J.P. (ed.) (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Tamas, G. (ed.). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. 205p. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

In the proceedings of the workshop, held at the Institut de Physique Nucleaire in Orsay, France, full texts of 20 contributions are presented. The two main topics were polarized electrons and polarized photons. It has been reported that significant processes have been made recently in the science and technology of polarized electron sources, polarized targets and polarimeters. The relevant tools are therefore now available to complete extensive experimental programs. The 20 papers are indexed and abstracted separately for the INIS database. (R.P.).

32260 (IPNO–1990/1, pp. 1-12) **Nucleon form factors.** Jourdan, J. (Basel Univ. (Switzerland). Inst. fuer Physik). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The electromagnetic form factors of the nucleon are fundamental quantities relevant for an understanding of both nucleon and nuclear structure. Some of the form factors, in particular the neutron charge and magnetic form factors are known with comparatively poor accuracy due to both experimental systematical errors and the exploration of observable sensitive to uncertainties in the theoretical description. The proposed approaches for the future, using polarized electrons promise an order-of-magnitude type improvement. (author) 32 refs., 5 figs.

32261 (IPNO–1990/1, pp. 16-20) **First polarization experiments at MAMI B.** Andresen, H. (Mainz Univ. (Germany). Inst. fuer Kernphysik); Ertel, M.; Eyl, D.; Frey, A.; Klein, F.; Loos, R.; Rieger, R.; Schmieden, H.; Sprenger, M.; Steffens, K.H.; Steinel, A.; Straub, M.; Walcher, Th.; Welling, M.; Annand, J.; Hall, S.; Miller, G.; OA3 Collaboration. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The advent of high duty cycle machines has opened up the area of coincidence experiments, both in and out-of-plane, allowing the measurement of four exclusive structure functions with a corresponding gain of information. MAMI B has successfully produced a 855 MeV electron beam in august 1990. The first two polarization experiments will be devoted to the measurement of the electric formfactor $G_{E,n}$ of the neutron in a range of momentum transfer $Q^2 = 5 - 15\ fm^{-2}$ using $^2D(e,e'n)$ and $^3H\ e(e,e'n)$. The necessary e-source, spin rotator, e-polarimeter, ^3H e-target and n-polarimeter are under construction. (author) 14 refs., 1 fig., 1 tab.

32262 (IPNO–1990/1, pp. 22-29) **Study of few-body systems using recoil detection.** Blok, H.P. (Vrije Univ., Amsterdam (NL). Dept. of Physics and Astronomy). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The possibilities of recoil detection for some interesting physics questions are discussed, and some examples are presented. After the description of recoil detectors for the detection of p, d, t, ^3He and ^4He particles to study $^4He(e,e'n)^3He$ type reactions, some particular experiments including the (virtual) photon-neutron coupling, two-nucleon knockout, electro-pion production and polarization studies are presented. (R.P.) 12 refs., 6 figs.

32263 (IPNO–1990/1, pp. 31-43) **Measurement of spin-dependent electron scattering from a polarized ^3He internal target.** Brand, J.F.J. van den (Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Physics). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

A polarized electromagnetic physics experiment is described, using the option of polarized internal gas target in electron storage rings. The electromagnetic response of the ^3He nucleus was measured, and the three-body system was used for theoretical calculations. The technical aspects of the measurement, and the various asymmetries obtained in inclusive and exclusive experiments are discussed. The emphasis is placed on the sensitivity of the measured asymmetries. (R.P.) 16 refs., 5 figs., 2 tabs.

32264 (IPNO–1990/1, pp. 44-52) **Nucleon recoil polarization in quasi-elastic electron scattering with two-body currents.** Boffi, S. (Pavia Univ. (IT). Dipt. di Fisica Nucleare a Teorica); Giusti, C.; Pacati, F.D.; Radici, M. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The nucleon recoil polarization is considered in (e,e'N) reactions with polarized electrons. The theoretical framework is based on the one-photon exchange approximation, with an the electromagnetic current of the target nucleus built with one- and two-body contributions coming from meson-exchange currents and isobar configurations in intermediate nuclear states. Specific calculations are presented for the different structure functions, the polarization and the transfer polarization coefficient of both the proton and the neutron knockout. The ^{16}O target nucleus is taken as an example to set the scale for possible experiments. The sensitivity to final state interactions, mesonic effects and isobaric configurations is discussed. (author) 19 refs., 4 figs.

32265 (IPNO–1990/1, pp. 53-57) **Spin correlations in photo- and electro-disintegration of the few-body systems.** Laget, J.M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (FR). Service d'Experimentation en Physique Nucleaire). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

Very few results exist in the study of spin observables with electromagnetic probes, contrary to hadronic probes. Recent progress in handling polarized beams of electrons and photons allow to undertake the systematic study of the spin observables in hadronic matter. Spin can be used to select the part of the cross-section which is directly proportional to the interference between the Coulomb and the transverse part of the transition amplitude. The main axes are given. (R.P.) 4 refs., 2 tabs.

32266 (IPNO–1990/1, pp. 149-166) **Tagged photon beams obtained by laser Compton scattering on electron beams.** D'Angelo, A. (Rome Univ. (Italy)). LADON Collaboration. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The back-scattering of laser light against the high energy electrons circulating in storage rings produces fully polarized γ-ray beams, with energies and resolutions useful for the study of photonuclear reactions. This technique is being used in Frascati, where a tagged beam with a maximum energy of 80 MeV has been produced, and at Brookhaven, where the beam has a maximum energy of 300 MeV and an intensity of 10^6+10^7 γ/s. We also present a project which is underway to produce a similar beam in the ESRF at Grenoble, with a maximum energy of 1.5 GeV. Some possible experiments using this new beam are indicated. (author) 9 refs., 18 figs., 5 tabs.

32267 (IPNO–1990/1, pp. 187-192) **Measuring the Drell-Hearn-Gerasimov sum-rule.** Botton, N. de (European Organization for Nuclear Research, Geneva (Switzerland)); d'Hose, N. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The Drell-Hearn-Gerasimov (DHG) sum rule deals with the process of absorption of circularly polarized photons by longitudinally polarized nucleons. An experiment is described briefly for the measurement of the DHG sum rule using existing techniques. Two possibilities are available for producing circularly polarized photons were produced. The DHG integral value could be measured on protons in the energy range from pion photoproduction threshold to 1.5 GeV. (R.P.) 11 refs., 2 figs.

32268 (ISN–91-05) **Measurement and analysis of charge partitions in nuclear disassembly.** Desesquelles, P. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires); Cole, A.J.; Giorni, A.; Heuer, D.; Lleres, A.; Morand, C.; Stassi, P.; Viano, J.B.; Chambon, B.; Cheynis, B.; Drain, D.; Pastor, C. Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires. 1991. 9p. (CONF-910111–: 29. international winter meeting on nuclear physics, Bormio (Italy), 14-25 Jan 1991). Order Number DE92570110. Source: OSTI; NTIS (US Sales Only); INIS.

Analysis of charge partitions for a total measured charge of 20 detected at forward angles by the AMPHORA multidetector in the reaction ^{40}Ca+^{nat}Cu at 35 MeV/nucleon provides strong evidence for an initial equilibrium state. The probability of observing a partition is well described in terms of a multinomial formula whose parameters are strongly correlated with the mass excesses of individual members. A similar result is obtained for partitions of charge 8 from the reaction ^{16}O+^{9}Be at 32.5 MeV/nucleon. (author) 9 refs., 4 figs.

32269 (LA–12343-MS) **Comprehensive nuclear model calculations: Introduction to the theory and use of the GNASH code.** Young, P.G.; Arthur, E.D; Chadwick, M.B. Los Alamos National Lab., NM (United States). Jul 1992. 158p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019467. Source: OSTI; NTIS; INIS; GPO Dep.

A user's manual describing the theory and operation of the GNASH nuclear reaction computer code is presented. This work is based on a series of lectures describing the statistical Hauser-Feshbach plus preequilibrium version of the code with full angular momentum conservation. This version is expected to be most applicable for incident particle energies between 1 kev and 50 MeV. General features of the code, the nuclear models that are utilized, input parameters needed to perform calculations, and the output quantities from typical problems are described in detail. The computational structure of the code and the subroutines and functions that are called are summarized as well. Two detailed examples are considered: 14-MeV neutrons incident on ^{93}Nb and 12-MeV neutrons incident on ^{238}U. The former example illustrates a typical calculation aimed at determining neutron, proton, and alpha emission spectra from 14-MeV reactions, and the latter example demonstrates use of the fission model in GNASH.

32270 (OUP–92-08) **Isobar contributions to the imaginary part of the optical-model potential for finite nuclei.** Hjort-Jensen, M. (Tuebingen Univ. (Germany)); Borromeo, M.; Muether, H.; Polls, A. Oslo Univ. (Norway). Fysisk Inst. Mar 1992. 34p. Order Number DE92645139. Source: OSTI; NTIS; INIS.

A recently developed non-relativistic method for calculating the nucleon optical-model potential has been employed to evaluate the contributions from isobaric degrees of freedom to the imaginary part of the nucleon optical-model potential. To evaluate the imaginary part of the optical-model potential, the authors include the contributions from terms to second order in the Brueckner G-matrix with and without the inclusion of isobars Δ. Results for ^{16}O are presented in this work. The contributions to the imaginary part are given by the two-particle-one-hole (2p1h) and three-particle-two-hole (3p2h) diagrams. The latter contributes at negative energies only and the contribution from isobar intermediate states is rather small. The 2p1h receives significant contributions from isobars at energies near the resonance and above the threshold for the excitation of $\Delta\Delta$ states. In particular, the importance of $\Delta\Delta$ configurations is rather sensitive to the treatment of short-range correlations. The parameterization of the self-energy in terms of local potentials is discussed. The depletion of the occupation of the single-particle orbits due to nucleon-nucleon correlations and Δ excitations is evaluated. 49 refs., 14 figs., 3 tabs.

6634 Specific Nuclear Reactions and Scattering

Refer also to citation(s) 30781, 32135, 32151, 32192, 32240, 32244, 32251, 32254, 32259, 32266, 32267, 32432, 32462

32271 (ANL/CP–76673) **ABAREX: A neutron spherical optical-statistical model code.** Lawson, R.D. Argonne National Lab., IL (United States). Jun 1992. 71p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920253–2: International Centre for Theoretical Physics (ICTP) workshop on computation and analysis of nuclear data relevant to nuclear energy and safety, Trieste (Italy), 10 Feb - 15 mar 1992). Order Number DE92018789. Source: OSTI; NTIS; INIS; GPO Dep.

The spherical optical-statistical model is briefly reviewed and the capabilities of the neutron scattering code, ABAREX, are presented. Input files for ten examples, in which neutrons are scattered by various nuclei, are given and the output of each run is discussed in detail.

32272 (ANL/CP–76820) **A pocketful of tin isomers from heavy-ion collisions.** Daly, P.J. (Purdue Univ., Lafayette, IN

(United States)); Broda, R.; Fornal, B.; Mayer, R.H.; Nisius, D.; Bearden, I.; Benet, P.; Grabowski, Z.W.; Lauritsen, T.; Carpenter, M.; Janssens, R.V.F.; Khoo, T.L.; Liang, Y.; Lunardi, S.; Blomqvist, J. Argonne National Lab., IL (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38 ;FG02-87ER40346. (CONF-920555–2: 4. international spring seminar on nuclear physics: the building blocks of nuclear structure, Amalfi (Italy), 18-22 May 1992). Order Number DE92019674. Source: OSTI; NTIS; INIS; GPO Dep.

Reaction products of ^{122,124}Sn + ^{76}Ge(^{80}Se) collisions 10–15% above the barrier have been studied by γ-ray spectroscopy, and new yrast isomers in $^{119--124}$Sn isotopes have been identified and characterized. B(E2) values determined for $(\nu h_{11/2})^n$ $10^+ \rightarrow 8^+$ transitions in even-A Sn nuclei pinpoint half-filling of the $\nu h_{11/2}$ subshell close to N = 73. In odd-A Sn isotopes, $19/2^+$ isomers with 1–10 μs half-lives occur systematically, and higher-lying $(\nu h_{11/2})^n v=3$ $27/2^-$ isomers in ^{119}Sn and ^{121}Sn have also been identified. These deep inelastic excitation processes were found to populate a large number of neutron-rich nuclei strongly enough for yrast spectroscopy studies.

32273 (BNL–47764) **The K$^+$ as a probe of nuclear medium effects.** Chrien, R.E. Brookhaven National Lab., Upton, NY (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9205238–2: Workshop on strangeness in nuclei, Krakow (Poland), 5-7 May 1992). Order Number DE92019236. Source: OSTI; NTIS; INIS; GPO Dep.

The study of the K+ total cross sections on a wide range of nuclei has revealed important modifications of the free-space K+ - nucleon interaction when the nucleon is embedded in a nucleus. In addition to the previously published data on carbon and deuterium we report here the extension of such measurements to lithium, silicon, and calcium. We demonstrate that the previous reported medium modifications for carbon occur quite generally. The results are discussed as evidence for partial quark deconfinement at nuclear densities.

32274 (BNL–47765) **Two-nucleon production of hyperons in an S = −1 dibaryon search.** Chrien, R.E. E820 Collaboration. Brookhaven National Lab., Upton, NY (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9205238–1: Workshop on strangeness in nuclei, Krakow (Poland), 5-7 May 1992). Order Number DE92019219. Source: OSTI; NTIS; INIS; GPO Dep.

The double-charge-exchange reaction ^{3}He(K^-, π^+)Xn was studied at p_{K^-} = 870 MeV/c. In the missing mass range below the sigma-nucleon production threshold (3075 MeV/c^2) events were detected and attributed to the two-nucleon reaction pp(K^-, π^+)Λn. This reaction and mass range is supposed to be a fertile field for a search for the I = 1/2, L = 1 ($^1P_1$) spin-singlet dibaryon suggested as the lowest mass S = −1 dibaryon of bag model predictions. We find no need to invoke such an object to account for the observed events below Σ production threshold.

32275 (CEA-CONF–10850) **Dione status report.** Courtois, A.; Faure, J.; Gobin, R.; Leroy, P.A.; Visentin, B.; Zupranski, P. Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). 1991. 3p. (CONF-9109420–: 4. International Meeting on the Ion Sources, Darmstadt (Germany), 30 Sep - 4 oct 1991). Order Number DE92566700. Source: OSTI; NTIS (US Sales Only); INIS.

The SATURNE synchrotron facility is equipped with an EBIS source for heavy ion nuclear-physics experiments. SATURNE is accelerating either conventional heavy ions as Kr^{30+} or polarized ^{6}Li^{3+} produced in 2 external ion sources, injected and stripped inside DIONE. In this report, the DIONE last performances will be given and recent developments as well: evaporative cooling experiments and the main options for a new EBIS project: RHEA.

32276 (CONF-9106158–1) **Orbiting: toward a unified model of nucleus-nucleus collision or excitation of nuclear molecular states in heavy ion collisions?.** Ray, A.; Shapira, D. Oak Ridge National Lab., TN (United States). [1991]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From NIKKO'91: towards a unified picture of nuclear dynamics; Nikko (Japan); 6-14 Jun 1991. Order Number DE91011375. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. HEAVY ION REACTIONS/excitation; CARBON 12 TARGET/silicon 28 reactions; CARBON 12 TARGET/neon 20 reactions; EXCITATION; ORBITS; COMPOUND NUCLEI; EXCITED STATES; SPIN

32277 (CONF-921102–3) **Contributions of Gerard deSaussure to fission physics: Subthreshold and near-subthreshold measurements at the ORELA.** Perez, R.B. (Tennessee Univ., Knoxville, TN (United States). Dept. of Nuclear Engineering); Difilippo, F.C. Oak Ridge National Lab., TN (United States); Tennessee Univ., Knoxville, TN (United States). Dept. of Nuclear Engineering. [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Joint American Nuclear Society/European Nuclear Society international meeting; Chicago, IL (United States); 15-20 Nov 1992. Order Number DE92015233. Source: OSTI; NTIS; INIS; GPO Dep.

In the late sixties, Strutinsky's theoretical work on the structure of the fission barrier, together with some new neutron cross section measurements performed at Saclay and Gel, called Gerard deSaussure's attention, who immediately recognized the importance of those developments. Indeed, deSaussure was quick in noting that for neutron energies in the range of the fission barrier potential energy, fission cross-section measurements would yield direct information about the physical properties of the fission barrier. Under his leadership, a set of extensive and precise measurements were performed at the Oak Ridge Electron Linear Accelerator by an international group of researches, lasting over two decades. Those measurement were unique in many respects: fission widths were determined for many previously unreported resonances, in the subthreshold region and a detailed study was performed on the physical properties of the fission barrier at high nuclear deformation. In this paper, we would like to report a specific part of the extensive involvement of deSaussure in the area of subthreshold fission physics: the one pertaining to the 1979 measurement of the ^{28}U(n,f) cross section in the subthreshold and near-subthreshold regions. This cross section was measured in the energy region between 5 eV and 3.5 Mev using a large fission chamber loaded with high purity ^{238}U, which had less than 2 ppm of ^{235}U.

32278 (CONF-921144–1) **Experimental challenges at RHIC and LHC.** Young, G.R. Oak Ridge National Lab., TN (United States). Mar 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 9. international conference on ultra-relativistic nucleus-nucleus collisions; Gatlinburg, TN (United States); 11-15 Nov 1992. Order Number DE92011780. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses a number of experiments in heavy ion collisions used to discover the quark-gluon plasma. (LSP)

32279 (CRN-PN–91-18) **Statistical emission of complex fragments from highly excited compound nucleus.** Matsuse, T. (Shinshu Univ., Ueda, Nagano (Japan). Faculty of Textile Science and Technology); Lee, S.M.; Pu, Y.H.; Nakagawa, K.Y.; Beck, C.; Nakagawa, T. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1991. 20p. (CONF-9106158–: NIKKO'91: towards a unified picture of nuclear dynamics, Nikko (Japan), 6-14 Jun 1991). Order Number DE92570101. Source: OSTI; NTIS (US Sales Only); INIS.

A full statistical analysis has been given in terms of the Extended Hauser-Feshbach method. The charge and kinetic energy distributions of ^{35}Cl+^{12}C reaction at E_{lab} = 180, 200 MeV and ^{23}Na+^{24}Mg reaction at E_{lab} = 89 MeV which form the ^{47}V compound nucleus are investigated as a prototype of the light mass system. The measured kinetic energy distributions of the complex fragments are shown to be well reproduced by the Extended Hauser-Feshbach method, so the observed complex fragment production is understood as the statistical binary decay from the compound nucleus induced by heavy-ion reaction. Next, this method is applied to the study of the complex production from the ^{111}In compound nucleus which is formed by the ^{84}Kr+^{27}Al reaction at E_{lab} = 890 MeV. (K.A.) 18 refs., 10 figs.

32280 (CRN-PN–91-22) **Energy damping and intermediate velocity fragment emission in peripheral Kr+Au collisions at 43 MeV/u.** Stuttge, L. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires); Adloff, J.C.; Bilwes, B.; Bilwes, R.; Cosmo, F.; Glaser, M.; Rudolf, G.; Scheibling, F.; Bougault, R.; Colin, J.; Delaunay, F.; Genoux-Lubain, A.; Horn, D.; Le Brun, C.; LecollStrasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires. 1991. 29p. Order Number DE92570102. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nucl. Phys. (US).

Triple and four-fold coincidences among fragments have been measured in the reaction ^{197}Au(^{84}Kr,X) at 43 MeV/u. All events showing the projectile-like nucleus and fission fragments of the target-like nucleus, and all events with one additional intermediate velocity fragment, were analysed in the frame of a dissipative collision and a participant-spectator model. The mechanism is basically that of a dissipative collision but the emission of the intermediate velocity fragment by the target differs from an equilibrated evaporation. (author) 16 refs., 10 figs.

32281 (DOE/ER/40531–3) **Heavy-ion collisions and the nuclear equation of state: Progress report, August 15, 1991–March 1992.** Keane, D. Kent State Univ., OH (United States). Dept. of Physics. [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-89ER40531. Order Number DE92019364. Source: OSTI; NTIS; INIS; GPO Dep.

The overall goal of this project is to study nucleus-nucleus collisions experimentally at intermediate and relativistic energies, with emphasis on measurement and interpretation of correlation effects that provide insight into the nuclear phase diagram and the nuclear equation of state. During the past year, the PI has been on leave at Lawrence Berkeley Lab and has worked on this research project full-time. A large fraction of the effort of the PI and graduate students has gone into preparing for experiments using the Time Projection Chamber at LBL's Bevalac accelerator; in March 1992, this device successfully took data in production mode for the first time, and the first physics analysis is now under way. The PI has carried out simulations that help to define the physics performance and engineering specifications of the recently-approved STAR detector for the Relativistic Heavy Ion Collider, and has identified a new capability of this device with the potential for being an important quark-gluon plasma signature. A Postdoctoral Fellow, jointly supported by this grant and Kent State University, has been recruited to augment these efforts. Since May 1991, 11 journal papers have been published or submitted for publication; 2 conference proceedings and 9 reports or abstracts have also been published during the past year. One paper in Phys. Rev. Left., one in Phys. Rev. C, and one conference proceedings are based on the thesis project of one of the PI's Ph.D. students who is expected to graduate later this year. Partly in response to the impending closure of the Bevalac, the PI's group has recently joined the NA49 experiment at CERN.

32282 (ECN-RX–91-046) **The EFF-2 evaluation for the reaction systems n + ^{52}Cr, ^{56}Fe, ^{58}Ni and ^{60}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991.** Uhl, M. (Vienna Univ. (Austria). Inst. fuer Radiumforschung und Kernphysik); Gruppelaar, H.; Kamp, H.A.J. van der; Kopecky, J.; Nierop, D. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 12p. (CONF-910503–: International conference on nuclear data for science and technology, Juelich (Germany), 13-17 May 1991). Order Number DE93602821. Source: OSTI; NTIS; INIS.

The evaluated cross sections for incident energies between 1 and 20 MeV are essentially based on nuclear reaction model calculations. Model parameters were chosen so as to simultaneously reproduce many available experimental data. At low energies the cross sections were taken from other evaluations. Calculations consider the spherical optical model, the statistical compound nucleus model under consideration of angular momentum and parity, the exciton model for first change pre-equilibrium emission of particles and photons and a direct reaction model for in-elastic scattering. The exciton model employed accounted for angular momentum conservation. For each reaction system evaluation comprises the following cross sections: total, elastic, production of light reaction products (photons, neutrons, protons and alphas) and production of heavy reaction products (about 10 residual nuclei for each target). Furthermore included are the energy-angle distributions of the light reaction products and of the heavy reaction products (i.e. the double differential recoil spectra). (author). 34 refs.; 4 figs.

32283 (ECN-RX–91-051) **The pre-equilibrium picture of nucleon radiative capture and the neutron-to-gamma competition: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991.** Betak, E. (Slovenska Akademia Vied, Bratislava (Czechoslovakia). Fyzikalny Ustav); Cvelbar, F.; Kopecky, J. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 12p. (CONF-910503–: International conference on nuclear data for science and technology, Juelich (Germany), 13-17 May 1991). Order Number DE93602786. Source: OSTI; NTIS; INIS.

The pre-equilibrium (exciton) model is used to describe the continuous γ spectra as well as both the activation (σ_{act}) and the integrated (σ_{int}) cross sections (and their excitation functions) of the radiative capture of nucleons with energies ranging from 0 up to 80 MeV. The γ cascades are taken fully into account to evaluate properly σ_{act} (and its distinction with respect to σ_{int}). The calculations do not contain any free parameters for the γ emission. Comparison to available experimental data demonstrates clearly the necessity to include properly the level density parameters for individual nuclei. The low-energy behaviour of the proton radiative capture excitation functions supports the use of energy-dependent GDR width, which are employed in the generalized Lorentzian. (author). 14 refs.; 4 figs.

32284 (ECN-RX–91-061) **International evaluation cooperation task 1.1 : Intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991.** Fu, C.Y. (Oak Ridge National Lab., TN (United States)); Larson, D.C.; Hetrick, D.M.; Vonach, H.; Kopecky, J.; Iijima, S.; Yamamuro, N.; Maino, G. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jun 1991. 5p. (CONF-910503–: International conference on nuclear data for science and technology, Juelich (Germany), 13-17 May 1991). Order Number DE93602787. Source: OSTI; NTIS; INIS.

The cross sections and energy and angular distributions in the JENDL-3, JEF-2/EFF-2 and ENDF/B-VI evaluations for ^{52}Cr, ^{56}Fe and ^{58}Ni are compared graphically. The purpose is to understand the reasons for observed discrepancies among the evaluations, and to suggest recommendations for improvements. The accomplishments to date are presented. (author). 9 refs.; 3 figs.

32285 (INIS-mf–14069) **Gross properties of nuclei and nuclear excitations. Proceedings.** Feldmeier, H. (ed.). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Heavy ion reactions are the main topics of the workshop. The different aspects that are discussed are: nuclear matter at relativistic energies, the transformation to quark matter, particle production, spallation and theoretical models for nuclear reaction kinetics. (BBOE).

32286 (INIS-mf–14069, pp. 1-6) **An 'in acceptance' comparison of Si + Au data and RQMD predictions.** Moskowitz, B. (Brookhaven National Lab., Dept. of Physics, Upton, NY (United States)); Hansen, O.; Videbaek, F. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. Contract DE-AC02-76CH00016. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg

(Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. GOLD 197 TARGET/silicon 28 reactions; MULTIPLICITY; PARTICLE RAPIDITY; MULTIPLE PRODUCTION; TRANSVERSE MOMENTUM; GEV RANGE 10-100; CROSS SECTIONS; EXPERIMENTAL DATA; THEORETICAL DATA; PROTONS; PIONS; KAONS; ENERGY SPECTRA

32287 (INIS-mf–14069, pp. 7) **Baryon and pion distributions from nucleus-nucleus collisions at 15 GeV/nucleon.** Stachel, J. E814 Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. SILICON 28 REACTIONS/protons; SILICON 28 REACTIONS/pions; GEV RANGE 10-100; PROTONS; PIONS; TRANSVERSE MOMENTUM; MULTIPLICITY; DISTRIBUTION; MULTIPLE PRODUCTION; CHARGED PARTICLES; PARTICLE RAPIDITY; LEAD 208 TARGET; CROSS SECTIONS; STOPPING POWER

32288 (INIS-mf–14069, pp. 8-17) **Experimental considerations to measure thermal photons at RHIC.** Braun-Munzinger, P. (SUNY, Stony Brook, NY (United States). Physics Dept.); David, G. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

In this note we briefly review the current situation of thermal photon emission from a hot plasma and/or hadronic gas. The study of real or virtual photons emitted from the (hopefully) formed quark-gluon plasma (QGP) in nucleus-nucleus collisions at very high energy (RHIC, LHC) provides the only direct access to the hot initial phase of the collision, before hadronization takes places. In order to shed light on the question of whether and how directly produced real photons can be measured we will provide estimates for the ratio γ/πdeg as a function of the transverse momentum p_t for the case of Au+Au collisions at RHIC. For such estimates one needs both a scenario for the plasma and the phase transition as well as a description of the expected hadron spectra after freeze-out. In addition to calculations of photon emission from a plasma and mixed phase we will use present information on hadron spectra in pp collisions and appropriate scaling laws to estimate the shape of the πdeg spectrum in Au+Au collisions at RHIC. (orig.).

32289 (INIS-mf–14069, pp. 38-44) **FOrPI studies of Au on Au collisions at SIS energies.** Reisdorf, W. FOPI Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Last year our collaboration has performed several experiments at SIS, GSI Darmstadt, using Au beams between 100 and 800A MeV incident on Au targets. One of the main aims was to study cluster production in central collisions. Clusters (defined here as fragments with nuclear charge $Z > 2$), consisting of several nucleons traveling with a common velocity, should be a more sensitive probe of global flow than single hadrons would be. Flow properties, on the other hand. are believed to be influenced by the equation of state (EOS) of nuclear matter, it is also hoped that cluster distributions, or rather fluctuations thereof, may give signals of liquid-vapor phase transitions. Even before investigation these remote goals, one might simply ask if clusters are 'paricipating' members of the dynamics (compression-expansion) and hence influencing it, or whether they are just formed at a late stage by simple coalescence, or even if they are just 'spectator' remnants. (orig.).

32290 (INIS-mf–14069, pp. 45-49) **Exclusive studies of neutron and charged particle emission in relativistic heavy ion reactions.** Leifels, Y. LAND Collaboration; FOPI Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. GOLD 197 REACTIONS/charged particles; GOLD 197 REACTIONS/neutron emission; EXCLUSIVE INTERACTIONS; EQUATIONS OF STATE; NUCLEAR MATTER; TRANSVERSE MOMENTUM; PARTICLE RAPIDITY; IMPACT PARAMETER; NEUTRONS; NEUTRON DETECTION; FOUR-PI COUNTING; NEUTRON SPECTRA; THERMODYNAMIC MODEL; RELATIVISTIC RANGE; GOLD 197 TARGET

32291 (INIS-mf–14069, pp. 50-56) **Fragmentation of gold projectiles: From evaporation to vaporization.** Mueller, W.F.J. (Gesellschaft fuer Schwerionenforschung, Darmstadt (Germany)); Begemann-Blaich, M.; Hubele, J.; Kunde, G.J.; Lindenstruth, V.; Liu, Z.; Lynen, U.; Meijer, R.J.; Milkau, U.; Ogilvie, C.A.; Sann, H.; Trautmann, W.; Kreutz, P.; Pochodzalla, J.Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We have studied the fragmentation of Au projectiles interacting with targets of C, Al, Cu and Pb at an incident energy of $E/A = 600$ MeV. The experiment was performed with the ALADIN forward spectrometer at SIS. The employed inverse kinemantics allowed nearly complete detection of projectile fragments with charge $Z \geq 2$. In addition the number of light particles for each collision was measured. We compare different observables characterizing the event and investigate the impact parameter dependence of the fragmentation process. It is found that the correlation between the multiplicity of intermediate mass fragments $< M_{imf} ><$ and Z_{bound}, the sum charges of all projectile fragments with $Z \geq 2$, is independent of the target nucleus. This universal behavior is consistent with an - at least partial - equilibration of the projectile fragment prior to its decay. Finally we compare with two classes of statistical models, the sequential decay code GEMINI and statistical multifragmentation models as well as with QMD calculations. (orig.).

32292 (INIS-mf–14069, pp. 67-72) **Small angle correlations of intermediate mass fragments in reactions Au + Au at E/A = 100, 150, 250 MeV.** Kaempfer, B. (Forschungszentrum Rossendorf, Dresden (Germany)); Kotte, R.; Moesner, J.; Neubert, W.; Wohlfarth, D. 4pi Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Small angle correlations of intermediate mass fragments ($Z \geq 2$) produced in the reaction Au+Au at beam energies of 100, 150 and 250 x MeV are analyzed. The energy, multiplicity, fragment rapidity and fragment charge dependencies are presented. (orig.).

32293 (INIS-mf–14069, pp. 73-77) **Fluctuations of multiplicities in rapidity windows in sulphur-sulphur collisions at 200 AGeV.** Bartke, J. (Inst. of Nuclear Physics, Cracow (Poland)); Gladysz-Dziadus, E.; Stefannski, P. NA-35 Collaboration.

Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. SULFUR 32 REACTIONS/sulfur 32 target; SULFUR 32 REACTIONS/multiplicity; FLUCTUATIONS; PARTICLE RAPIDITY; MULTIPLICITY; MULTIPLE PRODUCTION; PIONS; TEV RANGE 01-10; CORRELATIONS; TRANSVERSE MOMENTUM; PROTONS; CHARGED PARTICLES

32294 (INIS-mf–14069, pp. 78-88) **Thermal properties and medium effects in the study of heavy-ion collisions with realistic NN interactions.** Khoa, D.T. (Inst. fuer Theoretische Physik der Univ. Tuebingen (Germany)); Ohtsuka, N.; Matin, M.A.; Faessler, A.; Huang, S.W.; Lehmann, E.; Puri, R.K. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/nuclear matter; THOMAS-FERMI MODEL; EQUATIONS OF STATE; ENERGY DENSITY; NUCLEON-NUCLEON INTERACTIONS; CROSS SECTIONS; RELATIVISTIC RANGE; NIOBIUM 93 TARGET; NUCLEAR TEMPERATURE; TRANSVERSE MOMENTUM; THERMODYNAMIC MODEL

32295 (INIS-mf–14069, pp. 94-99) **Hadronic gas models and equilibration in heavy ion collisions.** Davidson, N.J. (Dept. of Physics, Univ. of Pretoria (South Africa)); Miller, H.G.; Quick, R.M.; Ritchie, R.A.; Von Oertzen, D.W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. NUCLEAR MATTER/heavy ion reactions; HADRONS; EQUILIBRIUM; RELATIVISTIC RANGE; PARTICLE PRODUCTION; THERMODYNAMIC MODEL; BARYON NUMBER

32296 (INIS-mf–14069, pp. 100-108) **Particle production at SIS energies and the nuclear equation of state.** Senger, P. (GSI Darmstadt (Germany)); Ahner, W.; Cieslak, M.; Grosse, E.; Henning, W.; Koczon, P.; Schicker, R.; Schwab, E.; Baltes, P.; Muentz, C.; Oeschler, H.; Sartorius, S.; Wagner, A.; Bormann, C.; Brill, D.; Shin, Y.; Stein, J.; Stock, R.; Stroebele,KaoS Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/nuclear matter; HEAVY ION REACTIONS/particle production; EQUATIONS OF STATE; RELATIVISTIC RANGE; GOLD 197 TARGET; DIFFERENTIAL CROSS SECTIONS; PIONS; PROTONS; KAONS; GOLD 197 REACTIONS; PARTICLE IDENTIFICATION; RADIATION DETECTORS

32297 (INIS-mf–14069, pp. 109-112) **The high-energetic component in pion spectra from Au + Au and Ne + NaF at 1 GeV/u$^+$.** Baltes, P.; Muentz, C.; Oeschler, H.; Sartorius, S.; Wagner, A. KaoS Collaboration. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. GOLD 197 REACTIONS/gold 197 target; GOLD 197 REACTIONS/pions plus; MULTIPLICITY; SODIUM FLUORIDES; KINETIC ENERGY; ENERGY SPECTRA; NEON 22 REACTIONS; PARTICLE PRODUCTION

32298 (INIS-mf–14069, pp. 113-120) **N-body collisions in high-energy nuclear reactions.** Batko, G. (Nuclear Science Div., Lawrence Berkeley Lab., CA (United States)); Randrup, J.; Vetter, T. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

We study the effect of many-body collisions in simulations of nuclear dynamics. First the collision integral in the BUU model is generalized to include many-body collisions. We study a variety of experimental observables, for the case of Ca+ Ca at bombarding energies of 200-1000 MeV per nucleon, such as anisotropy, flow angle and sidewards momentum. The treatment is subsequently extended to include particle production and the production of kaons is especially considered. Overall, the results of the standard BUU model are affected relatively little by the incorporation of N-body collisions. (orig.).

32299 (INIS-mf–14069, pp. 193-200) **Hadronic sources of dileptons from heavy ion collisions at intermediate and relativistic energies.** Gudima, K.K. (Joint Inst. for Nuclear Research, Dubna (Russia)); Titov, A.I.; Toneev, V.D. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

The kinetic model developed previously for soft hadron-nucleus and nucleus-nucleus collisions has been extended to describe low mass dilepton production. A version of the quark-gluon string model is used to get an input information on unstable particles produced in hadron-hadron collisions. Taking into account a variety of e^+e^- sources, a fairly good description of available experimental data on dileptons created in both, p + Be collisions from 12 to 1 GeV and Ca+Ca collisons at the energies 2 and 1 GeV/nucleon, is attained. Confirming a previous estimate of the $\pi\pi$ annihilation process, it has been found that the $\omega/\rho \to e^+e^-$ decay contributes as much as $\pi\pi$ annihilation does and into the same region of invariant masses, even for Ca+Ca (1 GeV/nucleon) collisions. (orig.).

32300 (INIS-mf–14069, pp. 201-205) **Finite positive pion chemical potential and lepton pair production in heavy ion collisions.** Koch, P. (Inst. for Theoretical Physics, Univ. Regensburg (Germany)). Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

The implications of a finite positive pionic chemical potential for the production rate of lepton pairs in relativistic heavy ion collisions are discussed. In paritcular, $\mu^+\mu^-$-pairs with small invariant masses turn out to be strongly enhanced. (orig.).

32301 (INIS-mf–14069, pp. 206-210) **Collisions in an expanding pion gas and the pperpendicular to spectrum in ultrarelativistic heavy ion collisions.** Barz, H.W. (KAI e.V. im Inst. fuer Kern- und Hadronenphysik, Rossendorf, Dresden (Germany)); Bertsch, G.; Danielewicz, P.; Schulz, H.; Welke, G.M. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. Grant NSF 90-17077;NSF 89-05933;BMFT 06DR107. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Neglecting the mean field effects we solve the bosonic Boltzmann equation for an expanding gas of pions using the in-medium scattering matrix from a Bethe-Goldstone type equation. The increase of the scattering rate in the gas for large final state Bose occupancy factors is nearly compensated by an overall drop of the in-medium cross section. Investigating the effect of the $\pi\pi$ scattering in thermalizing the momentum distribution small values of the hadronization time are needed to obtain a strong enhancement at low pperpendicular to. (orig.).

32302 (INIS-mf–14069, pp. 211-215) **Onset of multifragmentation in medium energy heavy ion collisions.** Colonna, M. (Dipt. di Fisica, Univ. Catania (Italy)); Di Toro, M.; Bonasera, A.; Colonna, N. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/ spallation; SPALLATION; NUCLEAR FRAGMENTS; NUCLEAR REACTION KINETICS; PRECOMPOUND-NUCLEUS EMISSION; NUCLEAR MATTER; FLUCTUATIONS; DE-EXCITATION

32303 (INIS-mf–14069, pp. 236-238) **Subthreshold kaon production in 1 GeV/u Au+Au collision within quantum molecular dynamics.** Huang, S.W. (Inst. fuer Theoretische Physik, Univ. Tuebingen (Germany)); Li, G.Q.; Puri, R.K.; Lehmann, E.; Matin, M.A.; Khoa, D.T.; Lotfy, Y.; Faessler, A. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. GOLD 197 REACTIONS/kaons plus; GOLD 197 REACTIONS/gold 197 target; THRESHOLD ENERGY; PARTICLE PRODUCTION; EQUATIONS OF STATE; NUCLEAR MATTER; GEV RANGE 100-1000; NUCLEAR REACTION KINETICS; QUANTUM MECHANICS

32304 (INIS-mf–14069, pp. 239-244) **Relativistic mean-field three-fluid model for intermediate-energy heavy-ion collisions. Simulation of kinetic results.** Ivanov, Y.B. (GSI, Darmstadt (Germany)); Russkikh, V.N.; Schoenhofen, M.; Cubero, M.; Noerenberg, W. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/ nuclear reaction kinetics; RELATIVISTIC RANGE; KINETIC EQUATIONS; DISTRIBUTION FUNCTIONS; FLUIDS; MEAN-FIELD THEORY; NUCLEONS; NUCLEAR MATTER; EQUATIONS OF MOTION

32305 (INIS-mf–14069, pp. 254-256) **Relativistic quantum hadron molecular dynamics (RQHMD) for heavy collisions.** Lehmann, E. (Inst. fuer Theoretische Physik, Univ. Tuebingen (Germany)); Li, G.Q.; Maruyama, T.; Matin, M.A.; Huang, S.W.; Puri, R.K.; Khoa, D.T.; Lotfy, Y.; Faessler, A. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/ nuclear reaction kinetics; RELATIVISTIC RANGE; QUANTUM MECHANICS; CALCULATION METHODS; NUCLEONS; NUCLEAR MATTER; EQUATIONS OF STATE

32306 (INIS-mf–14069, pp. 257-261) **Relativistic BUU-approach with momentum-dependent mean-fields.** Maruyama, T. (Inst. fuer Theoretische Physik, Univ. Giessen (Germany)); Weber, K.; Blaettel, B.; Lang, A.; Cassing, W.; Mosel, U. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/ nuclear reaction kinetics; MEAN-FIELD THEORY; RELATIVISTIC RANGE; NUCLEAR MATTER; OPTICAL MODELS; NUCLEAR POTENTIAL; YUKAWA POTENTIAL; EQUATIONS OF STATE; NUCLEONS

32307 (INIS-mf–14069, pp. 273-277) **Medium dependent pion-production in heavy-ion collisions within the quantum molecular dynamics.** Puri, R.K. (Inst. fuer Theoretische Physik, Univ. Tuebingen (Germany)); Huang, S.W.; Matin, M.A.; Lehmann, E.; Khoa, D.T.; Lotfy, Y.; Faessler, A. Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany); Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik. 1992. 310p. (CONF-920195–: 20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies, Hirschegg (Austria), 20-25 Jan 1992). In *Gross properties of nuclei and nuclear excitations. Proceedings.* Order Number DE92557961. Source: OSTI; NTIS (US Sales Only); INIS.

Published in summary form only. HEAVY ION REACTIONS/ pions; PIONS; NUCLEAR REACTION KINETICS; QUANTUM MECHANICS; CALCULATION METHODS; PARTICLE PRODUCTION; N*BARYONS; NUCLEAR MATTER

32308 (IPNO–1990/1, pp. 95-106) **Polarization observables in meson photoproduction.** Bennhold, C. (Mainz Univ. (Germany). Inst. fuer Kernphysik). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

Polarization observables in the photoproduction of pseudoscalar mesons are discussed. Particularly, those single and double polarization observables are analyzed which the best suited might be to advance the knowledge of elementary photoproduction of pions, kaons and etas. For pion photoproduction the process $\gamma p \rightarrow \pi^P$, for eta photoproduction the reaction $\gamma p \rightarrow \eta p$, and for kaon photoproduction the process $\gamma p \rightarrow K^+\Lambda$ was considered with polarization observables. (R.P.) 12 refs., 6 figs., 2 tabs.

32309 (IPNO–1990/1, pp. 107-116) **Polarized target experiments in Bonn.** Anton, G. (Bonn Univ. (Germany). Physikalisches Inst.). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics* *in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

Spin effects are investigated using polarized target experiments at the Bonn stretcher ring ELSA. Two examples of polarized target experiments are presented: the target asymmetry measurement of pion photoproduction on nucleons, and deuteron photodisintegration. Some experimental aspects of polarized target experiments are discussed, and an experiment with the PHOENICS detection system is described. (R.P.) 13 refs., 8 figs.

32310 (IPNO–1990/1, pp. 117-135) **Deuteron photodisintegration by linearly polarized photons in the energy region 0.3-1.0 GeV.** Adamian, F.V. (Erevanskij Fizicheskij Inst., Erevan (Armenia)); Buniatian, A.Yu.; Frangulian, G.S.; Galumian, P.I.; Grabsky, V.H.; Hairapetian, A.V.; Hakopian, H.H.; Hoktanian, V.K.; Karapetian, G.V.; Karapetian, V.V.; Vartapetian, A.H.; Volchinsky, V.G. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

The cross-section asymmetry Σ of the deuteron photodisintegration process $d(\gamma,pn)$ has been measured in the energy range 0.3-1.0 GeV for proton cm angles 45, 60, 75 and 90 deg. The data obtained are compared with predictions of the existing theoretical models, based on the conventional approach as well as with the results of Kharkov multipole analysis which takes into account the contribution of dibaryon resonances. Neither of these theoretical models describe the experimental data satisfactorily. (author) 16 refs., 6 figs., 1 tab.

32311 (IPNO–1990/1, pp. 136-148) **Photoreactions on the nucleus and on the nucleon with polarized photons.** Giannini, M.M. (Genoa Univ. (IT). Dipt. di Fisica). Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

Investigations using monoenergetic photons up to 1.5 GeV allow to span the energy interval where nucleon resonances are excited. Some examples of experiments with polarized photons are presented. The photon-proton elastic scattering in the Δ-region is discussed for studying the Δ quadrupole excitation. The deuteron photodisintegration is briefly reviewed. Finally, the two-nucleon photoemission is proposed as a tool for the investigation of nucleon-nucleon correlations. (author) 34 refs., 13 figs., 1 tab.

32312 (IPNO–1990/1, pp. 167) **Grenoble contribution to the GRAAL collaboration.** Bocquet, J.P. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires); Gondrand, J.C.; Ghedira, L.; Furget, C.; Kox, S.; Merchez, F.; Perrin, C.; Rebreyend, D. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1990. (CONF-900726–: 7. international conference on polarization phenomena in nuclear physics, Paris (France), 4-13 Jul 1990). In *Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons.* 205p. Order Number DE92570037. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 fig. PHOTOPRODUCTION/tagged photon method; PHOTONUCLEAR REACTIONS; PHOTON BEAMS; STRANGE PARTICLES; PHOTOPRODUCTION

32313 (IPNO-DRE–91-13) **Dynamics and thermalization in violent collisions between ^{40}Ar and Ag at 27 MeV/nucleon.** Jouan, D. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Borderie, B.; Rivet, M.F.; Cabot, C.; Gauvin, H.; Gardes, D.; Fuchs, H.; Gregoire, C.; Hanappe, F.; Montoya, M.; Remaud, B. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 52p. Order Number DE92570059. Source: OSTI; NTIS (US Sales Only); INIS; Submitted to Z. Phys., A (DE).

For the violent collisions of 27 MeV/nucleon ^{40}Ar with Ag, coincidence measurements have been made between heavy residues and intermediate mass fragments ($3 \leq Z \leq 14$) or light charged particles. Main characteristics of the dominant mechanisms, fusion and partially damped collisions preceded or accompanied by a preequilibrium emission, are presented. Balances concerning mean values of parallel linear momentum, mass and atomic number, are established and confirm that a complete description of violent collisions was obtained. Then, thermalization is discussed, in terms of excitation energies derived from kinematics between heavy residues and intermediate mass fragments, and in terms of initial temperature estimates derived from light charged particle spectra. Very hot nuclei ($T \simeq 5.7$ - 6.6 MeV) are produced over a large impact parameter range from very central collisions to medium peripheral ones. From the good agreement between experimental results and predictions obtained with semi-classical calculations (Landau-Vlasov equation), one may conclude that, depending on the impact parameter, thermal equilibrium is achieved within 4-10×10^{-22} s. (author) 45 refs., 19 figs., 6 tabs.

32314 (IPNO-DRE–91-17) **A signature for isoscalar-spin transitions in (d,d') scattering at intermediate energy.** Morlet, M. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Bimbot, L.; Guillot, J.; Johnson, B.N.; Jourdan, F.; Langevin-Joliot, H.; Marty, N.; Rosier, L.; Wiele, J. van de; Willis, A.; Baker, F.T.; Beatty, D.; Edwards, G.; Fergerson, RParis-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. May 1991. 11p. Order Number DE92570061. Source: OSTI; NTIS (US Sales Only); INIS.

Three different signatures for isoscalar spin transitions in nuclei have been tested in the $^{12}C(d,d')^{12}C$ reaction at 400 MeV. These signatures have values close to zero for the natural parity states, and range from 0.22 to 0.50 for the $\Delta S=1$ $\Delta T=0$, 12.7 MeV state. Preliminary results on $^{40}Ca(d,d')$ at 400 MeV are also presented. (author) 26 refs., 4 figs., 1 tab.

32315 (IPNO-DRE–91-18) **Experimental searches for narrow dibaryons.** Tatischeff, B.; Comets, M.P.; Bornec, Y. Le; Willis, N. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 14p. (CONF-9106389–: International workshop on investigation of deuteron structure at high energy physics, Dubna (USSR), 11-13 Jun 1991). Order Number DE92570062. Source: OSTI; NTIS (US Sales Only); INIS.

A few topics of narrow structures in nuclear physics at excitation energies of several hundred MeV are overviewed. Among these topics, the physics of dibaryons is particularly interesting since if narrow structures are observed, they can be related to precursor partial quark deconfinement. This possibility simulated the large number of data corresponding to such studies. A brief literature survey of these studies is given. The studies and recent data included in this overview are: analyzing powers in nucleon-nucleon elastic scattering, the $p(d,pp)X$ reaction (X being the two proton missing masses), the $^{2}H(p,n)X^{++}$ reaction, and dibaryon searches from photonuclear reactions. (R.P.) 39 refs., 6 figs.

32316 (IPNO-DRE–91-20) **Giant resonances and multiphonons states in heavy ion reactions.** Frascaria, N. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 15p. (CONF-9106336–: 6. international conference on nuclear reactions mechanisms, Varenne (Italy), 10-15 Jun 1991). Order Number DE92570064. Source: OSTI; NTIS (US Sales Only); INIS.

The use of heavy ion probes for the study of excitation and decay of giant resonances is discussed. Heavy ions are shown to excite giant resonances with large cross section and peak to background ratios. A wealth of information can be extracted from fragment-particle coincidence experiments, both on the reaction mechanism and the nature of the excited resonances. Finally, a possibility of observing high multipolarity strength in one nucleon transfer reactions is investigated. (author) 17 refs., 17 figs.

32317 (IPNO-DRE–91-24) **Total cross sections for the PPπ deg channel in the inelastic PP interaction.** Didelez, J.P. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Reposeur, T.; Duval, M.A.; Frascaria, R.; Rappenecker, G.; Siebert, R.; Warde, E.; Blanpied, G.; Rigney, M.M.; Preedom, B.M.; Battistoni, G.; Bloise, C.; Satta, L.; Laget, J.Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 19p. Order Number DE92570066. Source: OSTI; NTIS (US Sales Only); INIS.

Total cross sections for the reaction $p + p \to p + p + \pi$ deg have been measured for proton incident energies ranging from 480 MeV to 560 MeV in 20 MeV steps, by detecting the decay γ-rays of the

π deg emitted at forward angles. Isoscalar partial cross sections (σ_{01}) are extracted by comparison to the known total cross sections of the $n + p \rightarrow n + n + \pi^+$ measured at the same incident energies. No signal in the energy dependence of the π deg production excitation function due to a possible narrow, isovector dibaryon resonance is noticeable in the data. (author) 19 refs., 5 figs., 2 tabs.

32318 (IPNO-TH–91-10) **Low energy $^{16}O+^{208}Pb$ elastic scattering: an attempt to analyze the microscopic effective potential.** Mau, N.V. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique); Ferrero, J.L.; Pacheco, J.C.; Bilwes, B. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. Mar 1991. 30p. Order Number DE92570075. Source: OSTI; NTIS (US Sales Only); INIS.

Elastic scattering of ^{16}O on ^{208}Pb is studied at 96, 104, 129.5, 192, 216.6 and 312.6 MeV. The $^{16}O+^{208}Pb$ potential is calculated first in the closure approximation model and compared to semi-phenomenological potentials. Then detailed contributions to the polarization real potential and to the imaginary potential due to the coupling of the elastic channels to the inelastic channels are calculated. The results are compared to the authors' model potential and used to test the main assumptions of the model. From that comparison a qualitative interpretation of the success of the model is proposed. At last the elastic scattering cross sections are calculated and compared to the data. (author) 41 refs., 6 figs., 5 tabs.

32319 (ISN–91-20) **Lambda attachment in fission: a probe of the necking dynamics.** Nifenecker, H.; Malek, F. PS177 LEAR Experiment Collaboration. Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires. Feb 1991. 27p. (CONF-910111–: 29. international winter meeting on nuclear physics, Bormio (Italy), 14-25 Jan 1991). Order Number DE92570085. Source: OSTI; NTIS (US Sales Only); INIS.

A schematic scission model is applied to the lambda attachment function recently obtained by the LEAR PS177 collaboration, in their measurement of the prompt fission of hypernuclei. The relationship between the slope parameter and the fission dynamics was examined in a more quantitative way. It is shown that the attachment function is sensitive to the scission configuration, necking dynamics and nuclear temperature at scission. It provides a new and powerful way to study the nuclear scission process. (R.P.) 19 refs., 9 figs.

32320 (JAERI–1325) **JENDL Dosimetry File.** Nakazawa, Masaharu (Tokyo Univ. (Japan). Faculty of Engineering); Iguchi, Tetsuo; Kobayashi, Katsuhei; Iwasaki, Shin; Sakurai, Kiyoshi; Ikeda, Yujior; Nakagawa, Tsuneo. Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment. Mar 1992. 132p. Sponsored by Japan Atomic Energy Research Inst., Tokyo (Japan). (NEANDC(J)–163/U;INDC(JPN)–152/L). Order Number DE92013755. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The JENDL Dosimetry File based on JENDL-3 was compiled and integral tests of cross section data were performed by the Dosimetry Integral Test Working Group of the Japanese Nuclear Data Committee. Data stored in the JENDL Dosimetry File are the cross sections and their covariance data for 61 reactions. The cross sections were mainly taken from JENDL-3 and the covariances from IRDF-85. For some reactions, data were adopted from other evaluated data files. The data are given in the neutron energy region below 20 MeV in both of point-wise and group-wise files in the ENDF-5 format. In order to confirm reliability of the data, several integral tests were carried out; comparison with the data in IRDF-85 and average cross sections measured in fission neutron fields, fast reactor spectra, DT neutron fields and Li(d,n) neutron fields. As a result, it has been found that the JENDL Dosimetry File gives better results than IRDF-85 but there are some problems to be improved in future. The contents of the JENDL Dosimetry File and the results of the integral tests are described in this report. All of the dosimetry cross sections are shown in a graphical form.

32321 (JAERI-M–92-020) **Measurement of formation cross sections of short-lived nuclei by 14 MeV neutrons–F, Mg, Si, Ti, Cr, Ni, Ga, Rb, Sr, Ag.** Kawade, Kiyoshi (Nagoya Univ. (Japan)); Yamamoto, Hiroshi; Kobayashi, Takashi; Katoh, Toshio; Iida, Toshiyuki; Takahashi, Akito. Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment. ©Mar 1992. 56p. Sponsored by Japan Atomic Energy Research Inst., Tokyo (Japan). (INDC(JPN)–154/L). Order Number DE92010632. Source: OSTI; NTIS (US Sales Only).

Sixteen neutron activation cross sections for (n,2n), (n,p), (n, n'p) and (n,α) reactions producing short-lived nuclei with half-lives between 20 s and 7 min have been measured in the energy range of 13.4 to 14.9 for F, Mg, Si, Ti, Cr, Ni, Ga, Rb, Sr and Ag. Seven half-lives of short-lived nuclei produced by 14 MeV or thermal neutron bombardments were measured with Ge detectors for ^{51}Ti, ^{60m}Co, ^{88}Rb, ^{91}Mo, ^{94}Y, ^{108}Ag and ^{109m}Pd in the spectrum multiscaling mode.

32322 (JAERI-M–92-029) **Polarized proton induced breakup of ^{12}C at 16 MeV.** Koori, Norihiko (Tokushima Univ. (Japan)); Watanabe, Yukinobu; Kashimoto, Hironori; Hane, Hiroki; Aoto, Akira; Nohtomi, Akihiro; Widodo, Susilo; Iwamoto, Osamu; Yamaguchi, Ryoji; Sagara, Kenji; Nakamura, Hiroyuki; Maeda, Kazuhide; Nakashima, Takao. Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Dept. of Physics. ©Mar 1992. 46p. Sponsored by Japan Atomic Energy Research Inst., Tokyo (Japan). (INDC(JPN)–156/L). Order Number DE92012257. Source: OSTI; NTIS (US Sales Only).

Double differential cross sections and analyzing powers were measured of protons and α particles emitted from the bombardment of ^{12}C with 16 MeV polarized protons. The measured energy spectra of protons and α particles were analyzed on the basis of the reaction model in which three or four-body simultaneous breakup process is taken into account. The calculated proton and α particle spectra show good agreement with the continuous spectra observed in the low outgoing energy range.

32323 (JINR-E–1-91-146) **Hadrons in statu nascendi.** Strugalski, Z. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 11p. Order Number DE92645232. Source: OSTI; NTIS (US Sales Only); INIS.

Nuclei were employed as suitable detectors to study space-and time-intervals of strong action. Such detectors can see all sorts of hadrons, resonances, and may be even bare or semibare quarks - in other words, hadrons in statu nascendi. They are efficient owing to high density of intranuclear matter. In short, preliminary results are: the hadron production in hadronic collisions goes by means of some intermediate objects. 16 refs.; 4 figs.

32324 (JINR-E–2-91-92) **Quantum effects and colour transparency in charmonium photoproduction on nuclei.** Kopeliovich, B.Z. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems); Zakharov, B.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 16p. Order Number DE92645153. Source: OSTI; NTIS (US Sales Only); INIS.

A rigorous quantum-mechanical treatment of colour transparency effects in diffractive photoproduction of c-barc-pairs on nuclei was developed. The evolution of the c-barc wave function during propagating through a nucleus is rather a considerable distortion of its form, than a trivial attenuation. One of the manifestations of the quantum effects is a nuclear antishadowing of Ψ' yield, i.e. transparency above one. On the contrary, a considerable nuclear shadowing is predicted for the photoproduction of J/Ψ, which has a much smaller absorption cross section than Ψ'. 26 refs.; 5 figs.; 1 tab.

32325 (JINR-E–4-91-106) **On different values of the neutron-electron scattering amplitude and neutron mean square charge radius obtained from the low-energy dependence of the scattering amplitude.** Nikolenko, V.G.; Popov, A.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1991. 4p. Order Number DE92645168. Source: OSTI; NTIS (US Sales Only); INIS.

Discrepancy far outside experimental errors between the values obtained by two teams for neutron-electron scattering amplitude and neutron mean square charge radius from describing the coherent amplitude and total cross sections σ_t of Bi, calculated within different approaches, will be here explained by the fact of omitting the terms responsible for interference between resonances when the optical theorem is applied to the total nuclear scattering resonance amplitude incorrectly taken as the sum of the amplitudes of single compound levels. 5 refs.

32326 (JINR-E–4-91-126) **Off-shell effects in the dynamical model of pion photoproduction on nucleon.** Chumbalov, A.A. (AN Kazakhskoj SSR, Alma-Ata (Kazakhstan). Inst. Yadernoj Fiziki); Kamalov, S.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 11p. Order Number DE92645154. Source: OSTI; NTIS (US Sales Only); INIS.

In terms of the dynamical model the rescattering effects for the E_{0+},M_{1+} and E_{1+} multipoles are analyzed. Strong correlation between the sensitivity to the off-shell behaviour of the $T_{\pi N}$-matrix and the representation of the pion propagator in the photoproduction operator is shown to exist. For the time-ordered choice of a pion propagator the effect of a final state interaction is determined by the charge-exchange channel. In this case the off-shell effects are not important. It is also shown that the value of the coupling constant of the E2-transition in the $\gamma N\Delta$-vertex depends on a version of the separable model for the πN interaction in the P_{33}-channel. 11 refs.; 2 figs.; 4 tabs.

32327 (JINR-E–4-91-132) **Resonance amplification of the nuclear reaction X(a,b)Y near the a+X channel threshold.** Melezhik, V.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 15p. Order Number DE92645189. Source: OSTI; NTIS (US Sales Only); INIS.

Deviation of the cross section for the nuclear reaction X(a,b)Y from the Gamow formula due to an interaction additional to the Coulomb one in the entrance channel has been analyzed. It is shown that the reaction cross section has an oscillating structure at low energies. If the maximum of the first oscillation is close to the threshold of the channel a+X, it has a resonance behaviour. The peculiarity of the cross sections leads to the resonance amplification of the rate for a muon-catalyzed fusion reaction ('in flight' fusion) $t\mu+d\to{}^4He+n+\mu$ at the energy ≈76 eV and may influence the μ-capture rate in a dense mixture of hydrogen isotopes. 26 refs.; 4 figs.

32328 (JINR-E–4-91-213) **Mechanism of enhanced yield of light particles in compound nucleus formation: diffusion description.** Antonenko, N.V. (Tomskij Politekhnicheskij Inst., Tomsk (Russian Federation). Inst. Yadernoj Fiziki, Ehlektroniki i Avtomatiki); Jolos, R.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1991. 12p. Order Number DE92645190. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Z. Phys., A.

In the formation of a compound nucleus the evolution of double-nuclear system is considered. The enhanced yield of light particles for some reactions is explained by the dynamic reasons. The role of quantum and thermal fluctuations is discussed. The results of the previous paper are confirmed. 11 refs.; 3 figs.

32329 (JINR-N–2-48-91, pp. 4-10) **Multiquark stable and metastable states.** Shahbazian, B.A.; Volokhovskaya, T.A.; Martynov, A.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. In *JINR rapid communications: Collection.* 45p. Order Number DE93000805. Source: OSTI; NTIS (US Sales Only); INIS.

In the stable state sector a candidate for the predicted A(I=1,2, Y=-1, B=2, S=-3)-dibaryon was observed in p-propane collisions at 10 GeV/c. Kinematical four-vertex, ten- and nine-constraint fits performed were successful in both cases. In the first one the dibaryon mass was fixed at the predicted values. In the second case the fitted mass values coincide with the predicted ones within the limits of errors. In the metastable state sector the $\Lambda p\pi$-resonance found in $n^{12}C$-collisions at 7 GeV/c has been confirmed in $p^{12}C$-interactions at 10 GeV/c. 10 refs.; 3 figs.; 2 tabs.

32330 (JINR-N–2-48-91, pp. 11-20) **A possible interpretation of anomalous behaviour of proton spectrum at 0 deg from deuteron fragmentation at 9 GeV/c.** Azhgirej, L.S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Ignatenko, M.A.; Yudin, N.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. (In Russian). In *JINR rapid communications: Collection.* 45p. Order Number DE93000805. Source: OSTI; NTIS (US Sales Only); INIS.

Momentum spectra of protons at 0 deg from relativistic deuteron fragmentation on nuclei are analyzed. Possible origins of the deviation of 0 deg proton spectrum in ${}^1H(d,p)X$ reaction at 9.1 GeV/c from the impulse approximation calculations are considered. It is shown that taking into account the finite angular resolution of the experimental apparatus and the corresponding normalization of the experimental data and also the contribution of protons from the scattering of deuteron nucleons on target protons, in addition to the stripping, allow these data to be brought into agreement with the calculation results in the framework of the relativistic impulse approximation. 19 refs.; 4 figs.

32331 (JINR-R–1-91-206) **Charge exchange ${}^7Li\to{}^7Be$ cross sections at 21 GeV/c on H,C,Al,Cu, Pb nuclei.** Avramenko, S.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy); Golokhvastov, A.I.; Belikov, Yu.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 8p. (In Russian). Order Number DE92645191. Source: OSTI; NTIS (US Sales Only); INIS.

The charge change and change exchange ${}^7Li\to{}^7Be$ cross sections were measured on C, Al, Cu, Pb and CH targets at a ${}^7Li$ momentum of 21 GeV/c. The measurement method is described. The charge exchange cross section data give evidence for a stronger A dependence of target-nuclei than that for peripheral collisions. 15 refs.; 2 figs.; 1 tab.

32332 (JINR-R–1-91-239) **Charge-exchange cross sections of the ${}^3H\to{}^3He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c.** Avramenko, S.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy); Gal'perin, A.G.; Belikov, Yu.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1991. 6p. (In Russian). Order Number DE92645178. Source: OSTI; NTIS (US Sales Only); INIS.

The cross sections of the (${}^3H\to{}^3He$) reaction on nuclei at 9 GeV/c have been measured. The results obtained with different targets are the following: H -0.71±0.06 mb, C -1.96±015 mb, Al -2.55±20 mb, Cu -3.42±27 mb, Pb -4.88±39 mb. The method of measurement is described. Possible sources of systematic errors are considered. 10 refs.; 1 fig.; 1 tab.

32333 (JINR-R–3-91-244) **Measurement of the cross section of the ${}^{36}Ar(n,\alpha){}^{33}S$ and ${}^{50}V(n,p){}^{50}Ti$ reactions induced by thermal neutrons.** Andzheevski, Yu.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics); Gledenov, Yu.M.; Zasyslov, G.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics; AN Ukrainskoj SSR, Kiev (Ukraine). Inst. Yadernykh Issledovanij. 1991. 8p. (In Russian). Order Number DE92645170. Source: OSTI; NTIS (US Sales Only); INIS.

The ${}^{36}Ar(n,\alpha){}^{33}S$ and ${}^{50}V(n,p){}^{50}Ti$ reactions induced by thermal neutrons were measured. The method of multiparameter measurements using the two-grid ionization chamber was employed. Values of cross sections for these reactions were obtained to be (6.3±0.6) mb and (277±42)μb, respectively. 11 refs.; 2 figs.

32334 (JINR-R–15-91-8) **To the problem of anomalous radiative proton capture in thick carbon targets.** Poyarkov, V.A. (Kievskij Gosudarstvennyj Univ., Kiev (Ukraine)); Sizov, I.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1991. 10p. (In Russian). Order Number DE92645162. Source: OSTI; NTIS (US Sales Only); INIS.

Detailed measurement of the resonance position in the region of proton energy ≈1700 keV was carried out during the investigation of the ${}^{12}C(p,\gamma){}^{13}N$ reaction at 'thicn' and 'thin' carbon targets. In both cases the resonance is observed at the proton enegy of (1686±1) keV and not 1700 keV, as some publications state. 18 refs.; 4 figs.; 2 tabs.

32335 (JINR-R–16-91-107) **Double differential neutron and proton productions cross sections in nucleus-nucleus collisions.** Komochkov, M.M. Joint Inst. for Nuclear Research, Dubna

(Russian Federation). Dept. of Radiation Safety. 1991. 18p. (In Russian). Order Number DE92645192. Source: OSTI; NTIS (US Sales Only); INIS.

Experimental double differential neutron and proton production cross sections in nucleus-nucleus collisions (DDPCS) are analyzed. On the basis of ascertained regularities ADPCS are described in analytical form for the aim of radiation environment and shielding prediction on the heavy ion accelerators. The reliability of such prediction is estimated by comparison of calculation and experimental data. 38 refs.; 5 figs.; 2 tabs.

32336 (KEK-PROC–91-14, pp. 92-98) **Spatial distribution of radionuclides produced by photonuclear reactions.** Nakamura, Takashi (Tohoku Univ., Sendai (Japan). Cyclotron and Radioisotope Center). National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240–: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

The spatial distribution of radionuclides produced in a medium by photonuclear reactions was investigated; photospallation products in a 15 cm thick copper target bombarded by the 900 MeV electron-induced bremsstrahlung radiation, and photonuclear reaction products in 20 cm thick cesium (Cs_2CO_3) and strontium ($SrCO_3$) targets bombarded by the 60 MeV bremsstrahlung. The measured activation rates were compared with the product of the available production cross section data and the bremsstrahlung spectra calculated with the EGS-4 Monte Carlo code. (author).

32337 (KEK-PROC–91-14, pp. 99-103) **Treatment of (γ, n) reaction by EGS4 code and connection to MCNP code.** Kase, T. (Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki (Japan). Tokai Works); Konashi, K.; Kishimoto, Y. National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). Dec 1991. (In Japanese). (CONF-9007240–: 1. EGS4 user's meeting in Japan, Tsukuba (Japan), 22-23 Jul 1990). In *Proceedings of the first EGS4 user's meeting in Japan.* 118p. Order Number DE92799118. Source: OSTI; NTIS; INIS.

The EGS4, a simulation code for electron-photon transport, has been improved to calculate the photonuclear reaction. Neutron yields in the Pb target bombarded by 34 MeV electron have been calculated by the improved code. The calculation results are well agreed with experimental data within 10%. We have used this code in order to estimate the transmutation of ^{137}Cs using bremsstrahlung. (author).

32338 (LA–12360-T) **Quasielastic scattering using the (p,n) reaction at 795 MeV.** Prout, D.L. Los Alamos National Lab., NM (United States). Aug 1992. 208p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92040323. Source: OSTI; NTIS; INIS; GPO Dep.

Thesis. Submitted to Univ. of Colorado, Boulder, CO.

A survey in nuclear mass and in momentum transfer of cross sections and analyzing powers in the quasielastic region has been made using the (p,n) reaction. The measurements were performed at an energy of 795 MeV at the Neutron Time of Flight Facility and the Weapons Neutron Research line at LAMPF. The (p,n) reaction isolates the isovector ($\vec{\tau}_1 \cdot \vec{\tau}_2$) part of the nucleon nucleus interaction. Standard models of quasielastic scattering were able to describe the magnitude and shape of the double differential cross sections very well if account was taken of a significant background from double scattering. In contrast, the quasielastic response was shifted to much higher excitation energy than what was expected. This was true for all nuclei at moderate to large momenta transfers. Neither the Coulomb energy shift nor RPA calculations with the standard particle hole (p-h) interactions could account for this large shift. The data argue for a repulsive interaction in both the transverse and longitudinal channels of the p-h interaction. A suppression of the quasielastic analyzing power compared to the free nucleon nucleon analyzing power was found in ^{nat}C at all the angles measured. The same region in ^{nat}Pb showed little or no suppression. Part of the suppression in the ^{nat}C data may be accounted for by relativistic models of the nucleus employing large vector and scalar potentials with an effective mass of .85 times the free nucleon mass. The relatively larger contribution of double scattering ^{nat}Pb($\vec{p}$, n) than to ^{nat}C($\vec{p}$, n) may account for the difference in analyzing power for these two targets in the quasielastic region.

32339 (LA-UR–92-2186) **Recent advances in the US fission yield and delayed neutron evaluations.** England, T.R. (Los Alamos National Lab., NM (United States)); Rider, B.F.; Brady, M.C. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921102–17: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92018877. Source: OSTI; NTIS; INIS; GPO Dep.

Over the past fifteen years, US reactor analysts have been presented with three major evaluated nuclear data bases: Evaluated Nuclear Data Files (ENDF/B) versions -IV, -V, and most recently, -VI. Advances in the quantity and quality of fission yield data have been almost exponential from evaluation to evaluation. The most recent release of ENDF/B-VI represents an entirely new approach to the evaluation of delayed neutron data. Due to the effort and expense of processing and testing the basic data evaluations for specific applications, data libraries contained in the m mn reactor physics codes are not usually dated with the release of a new evaluation. This is particularly true for the decay data files utilizing fission yield and delayed neutron data. The introduction of ANSI/ANS standards for data of this type would provide a mechanism for assuring the reliability and quality of data of this type. Working groups for each of these proposed standards are comprised of both US and international experts in areas of reactor physics utilizing these data, as well as the data evaluators themselves. This summary briefly discusses the status of the two data evaluations and the progress toward developing standards in each area.

32340 (LA-UR–92-2309) **Development and status of fission-product yield data and applications to calculations of decay properties.** Wilson, W.B.; England, T.R. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921102–19: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92018922. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. FISSION PRODUCTS/fission yield; NUCLEAR DECAY; NUCLEAR DATA COLLECTIONS; GAMMA SPECTRA; ENERGY DEPENDENCE; NEUTRON REACTIONS; URANIUM 235 TARGET; CROSS SECTIONS

32341 (LYCEN-T–9123) **Penetration of Hydrogen clusters from 10 to 120 kev/u in carbon foils. Study of their slowing-down and charge distribution of emerging fragments.** Ray, E.M. Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire; Lyon-1 Univ., 69 (France). Jun 1991. 39p. (In French). Order Number DE93701126. Source: OSTI; NTIS (US Sales Only); INIS.

This work is devoted to the experimental study of the interaction between fast (10 to 120 keV/p) hydrogen clusters with thin solid targets. First, we have studied the slowing-down of $H_n^+ (2 \leq n \leq 21)$ clusters through carbon foils. Up to date this had been made only with molecular ions. We obtain evidence for vicinage effects on the energy loss of proton-clusters. We show that for projectile energies larger than 50 keV/p, the energy loss of a proton in a cluster is enhanced when compared to that of an isolated proton of the same velocity. At lower incident energies, it is a decrease of the energy loss which is observed. The same effect is also observed in the energy lost in the entrance window of a surface barrier detector bombarded by clusters. This phenomenon is interpreted in terms of interferences between individual polarisation wakes induced by each proton of the cluster. In the second part, we propose an accurate method to study the charge state of the atomic fragments resulting from the dissociation of fast H_n^+ ($2 \leq n \leq 15$) clusters through a carbon foil. This method gives also the distribution of the neutral atoms among the emerging fragments. These distributions are finally compared with binomial laws expected from independent particles.

6635 Nuclear Mass Ranges

Refer also to citation(s) 32212, 32228, 32234, 32236, 32237, 32238, 32240, 32241, 32242, 32244, 32245, 32248, 32249, 32250, 32268, 32272, 32274, 32276, 32277, 32280, 32282, 32286, 32289, 32297, 32303, 32313, 32317, 32318, 32322, 32328, 32329, 32330, 32331, 32332, 32333, 32334, 32338, 32341

6636 Radiation Physics

Refer also to citation(s) 30938, 31266, 32529, 32531, 32541, 32545

32342 (CEAC-R–2-92) **Effectiveness in detecting fission fragments with ionization chambers.** Manrique Garcia, J. (Centro de Estudios Aplicados al Desarrollo Nuclear (CEADEN), La Habana (Cuba)); Monne, G. Comision de Energia Atomica, La Habana (Cuba). 1991 11p. (In Spanish). Order Number DE93602910. Source: OSTI; NTIS (US Sales Only); INIS.

Detection of fission fragments is important in nuclear measurements. When a high detection accuracy is required it is necessary to take in account the detection losses due to the absorption of fragments in the fissionable material. The losses corrections might change the final results in 2-3%. The traditional expression used in the calculation of the detection efficiency does not consider neither the density variation of the fissionable substance with its width, because it depends on the target material. That's why actually in many labs it is being searched new methods that allow to find the efficiency for each target. In this work a new method for determination of absorption efficiency is presented. The obtained results are analyzed.

32343 (CEAC-R–3-92) **Measurement of the removal sechtion of biological protection concretes in the spectrum of an AmBe source.** Sandin, C. (Centro de Estudios Aplicados al Desarrollo Nuclear (CEADEN), La Habana (Cuba)); Tenrreiro, J.; Desdin, L.; Sarria, P.; Monne, G.; Tellez, E.; Csikai, J. Comision de Energia Atomica, La Habana (Cuba). 1992 8p. (In Spanish). Order Number DE93602903. Source: OSTI; NTIS (US Sales Only); INIS.

A method to measure the neutron removal cross sections in cuban concrete for biological protection using the average spectrum of a radioisotopic source was developed. The method was verified by the measurements of different materials with know removal cross sections like Pb, paraffin and water. These spetial cuban concrete are elaborated on the basis of arids of limestone, limonite, magnetite, baryte and serpentine. The aim of this work is to contribute to the characterization of those concretes for its use in cuban nuclear installations. In the experiments were used an AmBe source with an strength of 10^6 n/s. and a long counter detector with associated electronics. It can be seen in the table that the concretes of magnetite and limonite have the best shielding properties for neutrons.

32344 (FEI–2155) **REMP1-PC computer code for optimization of radiation shields characteristics.** Dubinin, A.A.; Kurachenko, Yu.A. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1990. 14p. (In Russian). Order Number DE92645237. Source: OSTI; NTIS (US Sales Only); INIS.

The version of the REMP1 program designed for solution of problems of calculating radiation shield characteristics by the IBM PC AT/XT computer, is described. High-performance of the program enables to use it for optimization of shield characteristics in complex computer schemes for solution of multigroup tasks of calculating multidimensional shield problems, in systems of group constants preperation. Some results obtained in solution of model tasks including ones of optimizing radiation shield characteristics, are presented. 7 refs.; 3 tabs.

32345 (INP-MSU–90-34-180) **Two-flux Monte Carlo approach to electron diffusion in solids.** Shevchenko, L.V.; Yurchenko, B.N. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1990. 13p. (NIIYaF-MGU–90-34-180.). Order Number DE92645250. Source: OSTI; NTIS (US Sales Only); INIS.

By means of Monte Carlo method the diffusion of monoenergetic beam of primary 30 keV electrons in bulk target of Al, Cu, and Au is simulated. The fast but correct simulation model is proposed, which is based on Fano theory for electron stopping and utilizes relativistic Hartree-Fock approximation for electron-atom elastic scattering. Computed values are averaged over 200.000 electron trajectories. The two-flux formulation is applied to study the angular and energy structure of electron probe inside the target and to compute the absolute value of X-ray production depth distribution. The simulation results are compared with those obtained experimentally and good agreement is observed. 12 refs.; 5 figs.; 1 tab.

32346 (JINR-R–3-91-202) **Calculation of a variant of the 'inelastic' adiabatic spin-flipper for cold neutrons.** Pokotilovskij, Yu.N.; Shelkova, I.G.; Ehler, G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1991. 6p. (In Russian). Order Number DE92645239. Source: OSTI; NTIS (US Sales Only); INIS.

The results of numerical calculations of the probability of reverse of a slow neutron spin for the model of the adiabatic spin-flipper are presented. The spin-flipper serves for the magneto-resonance slowing down of neutrons, spreading along a mirror neutron guide. The slowing element uses constant magnets for the creation of the leading magnetic field. The results of the calculation show the principal possibility for the creation of a many-element slowing system and numerical calculation of the behaviour of the neutron spin in such devices. 13 refs.; 2 figs.; 1 tab.

32347 (JINR-R–16-91-177) **Neutron spectra in the energy range from 10^{-8} to hundreds of MeV measurement in hard scattered radiation fields.** Krylov, A.R.; Timoshenko, G.N.; Alejnikov, V.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 14p. (In Russian). Order Number DE92645238. Source: OSTI; NTIS (US Sales Only); INIS.

The technique of neutron spectra unfolding in wide energy range from 10^{-8} to hundreds of MeV on the base of multisphere Bonner's detector and plastic scintillator spectrometer ridings has been described. This technique is intended for neutron spectra measurements in fields of mixed scattered radiation behind accelerators shielding and neutron component of cosmic background. The expressions of neutron maximum equivalent and ambient doses in wide energy range and neutron fluences of energy above 20 MeV are presented. 13 refs.; 5 figs.

32348 (LA-UR–92-1805) **Applications of the Los Alamos High Energy Transport code.** Waters, L.; Gavron, A.; Prael, R.E. Los Alamos National Lab., NM (United States). [1992]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9208114–2: American Nuclear Society meeting, Jackson Hole, WY (United States), 16-19 Aug 1992). Order Number DE92017408. Source: OSTI; NTIS; INIS; GPO Dep.

Simulation codes reliable through a large range of energies are essential to analyze the environment of vehicles and habitats proposed for space exploration. The LAHET monte carlo code has recently been expanded to track high energy hadrons with FLUKA, while retaining the original Los Alamos version of HETC at lower energies. Electrons and photons are transported with EGS4, and an interface to the MCNP monte carlo code is provided to analyze neutrons with kinetic energies less than 20 MeV. These codes are benchmarked by comparison of LAHET/MCNP calculations to data from the Brookhaven experiment E814 participant calorimeter.

32349 (LA-UR–92-1847) **A caution on reliability using "optimal" variance reduction parameters.** Booth, T.E. Los Alamos National Lab., NM (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921102–12: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92017502. Source: OSTI; NTIS; GPO Dep.

With the development of the score "moment equations" in the 1970's and 1980's came a number of attempts to predict "optimal" biasing parameters that minimized the second score moment or that minimized the product of the variance and the computing time. This paper will give two examples where the fourth moment is infinite for the parameter choice that minimizes the variance. Thus, although the variance is minimized, the variance of the variance is infinite, making the estimated variance unreliable.

32350 (LA-UR-92-2073) **Comparison of TORT and THREEDANT on realistic X-Y-Z shielding problems.** Parsons, D.K. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921102-13: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92017444. Source: OSTI; NTIS; INIS; GPO Dep.

Three-dimensional discrete ordinates neutronics calculations are becoming practical. This paper will compare TORT and THREEDANT on some typical neutron/gamma shielding problems. This comparison is preliminary since both codes are still evolving. Comparisons were carried out on a Los Alamos CRAY-YMP supercomputer, though both codes can run on smaller computers. Version 1.3.5 of TORT and the current developmental versions of THREEDANT were used.

32351 (LIYaF-90-1605) **Production of the mirror foil for the ultracold neutron guides.** Borovikova, N.V.; Brandin, A.B.; Egorov, A.I.; Lobashev, V.M. AN SSSR, Leningrad (Russian Federation). Inst. Yadernoj Fiziki. 1990. 7p. (In Russian). Order Number DE92645240. Source: OSTI; NTIS (US Sales Only); INIS.

The method of the metallic mirror foils production from 0.1 to 0.6 mm thick is described. The neutron guides made of such foils combine good mechanical properties of metallic guide and high surface quality of glass guide. 3 refs.

32352 (SLAC-PUB-5829) **The early days of the S_n method.** Lathrop, K.D. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jun 1992. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-921102-2: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92014837. Source: OSTI; NTIS; GPO Dep.

Short communication. ITERATIVE METHODS/historical aspects; NEUTRON DIFFUSION EQUATION/iterative methods; NEUTRON TRANSPORT THEORY; NUMERICAL SOLUTION

32353 (Y/DD-564) **A stochastic/deterministic method for transient, three-dimensional neutron transport.** Waddell, M.W. Jr. (Oak Ridge Y-12 Plant, TN (United States)); Dodds, H.L. Oak Ridge Y-12 Plant, TN (United States). 11 Jun 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. (CONF-921102-14: Joint American Nuclear Society/European Nuclear Society international meeting, Chicago, IL (United States), 15-20 Nov 1992). Order Number DE92016690. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes the development of a method for solving the time-dependent, three-dimensional Boltzmann transport model. A hybrid stochastic/deterministic technique is utilized with a Monte Carlo code embedded inside of a quasi-static kinetics framework. The amplitude function is computed deterministically by a conventional point kinetics algorithm. The point kinetics parameters, reactivity and generation time, as well as the flux shape, are computed stochastically during the random walk of the Monte Carlo calculation. The code which has been developed based on this new method could serve as a benchmarking tool for other more approximate and less expensive kinetics codes. It would also be useful for modeling transients of systems with complex geometries. Furthermore, 3-D transport theory is needed in areas such as reactor accident studies which involve coolant voiding and/or core disassembly. Preliminary results are presented in this paper. The code is applied to a standard benchmark problem and the results are compared to another method.

6640 Atomic and Molecular Physics

Refer also to citation(s) 32432

6641 Theory of Electronic Structure of Atoms and Molecules

32354 (IPNO-TH-91-42) **Potential harmonic expansion for atomic wave functions.** Fabre de la Ripelle, M. (Paris-11 Univ., 91 - Orsay (France). Div. de Physique Theorique); Haftel, M.I.; Larsen, S.Y. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 32p. Order Number DE92570083. Source: OSTI; NTIS (US Sales Only); INIS.

One way to reduce the large degeneracy of the Hyperspherical Harmonic basis for solving few- and many-body bound state problems is to introduce an optimal basis truncation called the Potential Harmonic (PH) basis. Various PH truncation schemes are introduced, and their accuracies are evaluated in predicting the energies of the Helium and H^- ground states , and the excited 2^1S level of the Helium atom. It was found that the part of the PH basis that accounts for one-body correlations gives a better ground state energy for He than the Hartree-Fock approximation. When an orthogonal complement is introduced to the basis to account for e-e correlations, the error in the binding energy is found to be .00025 au and .00015 au for ground and excited helium, resp., and .00035 au for H^-. Furthermore, the PH truncation is about 99.9% accurate in accounting for contributions coming from large values of the global angular momentum. This PH scheme is also much more accurate than previous versions based on the Faddeev equations. The present results indicate that the PH truncation can render the Hyperspherical Harmonic method useful for systems with N>3. (R.P.) 14 refs., 4 tabs.

6642 Spectra of Atoms and Molecules and Their Interactions With Photons

Refer also to citation(s) 31422, 31423, 31424, 32360

32355 (DOE/ER/45415-3) **Theoretical standards in x-ray spectroscopies: Annual progress report, 1991-1992.** Washington Univ., Seattle, WA (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-90ER45415. Order Number DE92040065. Source: OSTI; NTIS; INIS; GPO Dep.

We propose to extend our state-of-the-art, ab initio XAFS (X-ray absorption fine structure) codes, FEFF. Our current work has been highly successful in achieving accurate, user-friendly XAFS standards, exceeding the performance of both tabulated standards and other codes by a considerable margin. We now propose to add the capability to treat more complex materials. This includes multiple-scattering, polarization dependence, an approximate treatment of XANES (x-ray absorption near edge structure), and other improvements. We also plan to adapt FEFF to other spectroscopies, e.g. photoelectron diffraction (PD) and diffraction anomalous fine structure (DAFS).

32356 (KFK-4993) **Methods reducing doppler broadening in laserspectroscopy of stored ions and the isotope shifts of hafnium.** Rink, J. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Kernphysik; Heidelberg Univ. (Germany). Fakultaet fuer Physik und Astronomie. Feb 1992. 91p. (In German). Order Number DE93702350. Source: OSTI; NTIS (US Sales Only); INIS.

In context to determine nuclear parameters of stored hafnium ions with laserspectroscopic methods the isotope shifts of the isotopes with even mass numbers from ^{172}Hf to ^{180}Hf have been measured. The value for the isotope ^{172}Hf and with it the change of the mean square charge radius has been unknown so far. Hafnium ions were stored in a Paul trap for mote than four hours. The advantage in using an ion trap is the small necessary sample size. In the case of hafnium an amount of 10 pg is sufficient. Because of the ion velocity the linewidth of a spectrum is doppler-broadened. This is mainly due to the applied storage voltage. The spectral resolution is not enough to measure isotope shift and hyperfine structure of hafnium ions. Therefore new methods have been developed to reduce the linewidth by excitation of the ions with light only in definite phases of the applied alternating voltage. The width of the spectra is then reduced to a factor three. The signal strength decreases not more than 50%. (orig.).

6643 Collision Phenomena

Refer also to citation(s) 31424, 31426, 32410

32357 (DOE/ER/13519–6) **Experimental study of interactions of highly charged ions with atoms at keV energies: Progress report, July 1, 1991–June 30, 1992.** Kostroun, V.O. Cornell Univ., Ithaca, NY (United States). 5 Jul 1992. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER13519. Order Number DE92019512. Source: OSTI; NTIS; INIS; GPO Dep.

This Progress Report describes the experimental work carried out, and the work in progress, at the Cornell EBIS Laboratory during the period 7/1/1991 to 6/30/1992. During this period, a number of experiments were carried out. The absolute values of the total, one, two and three electron transfer cross sections for highly charged argon ions ($8 \leq q \leq 16$) colliding with argon at 2.3 qkev laboratory energy were measured. The distribution of recoil ions and molecular fragments formed in highly charged ion atom and molecule collisions was measured in order to help the interpretation of electron spectra in the 40–320 eV energy range emitted in Ar^{q+}+Ar($8 \leq q \leq 16$) collisions at 2.3 qkeV that were measured in our laboratory. The interpretation of the electron spectra is still under way. A new collision chamber was built which contains an ion decelerating lens system and a high resolution monochromator-analyzer combination. Ions extracted from the Cornell Electron Beam Ion Source were successfully decelerated from 2.3 qkeV down to 30 qeV Preliminary 0° translational energy spectra for Ar^{12+} on Ar at a collision energy of 38.6 qeV show a 0.56 qeV resolution. Work is in progress to extend measurements of cross sections and recoil ion charge state distributions down to collision energies in the 10 eV/amu range.

32358 (DOE/ER/14145–T1) **Physics of correlated systems: Progress report, December 1, 1991–November 30, 1992.** Greene, C.H. Colorado Univ., Boulder, CO (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER14145. Order Number DE92018927. Source: OSTI; NTIS; INIS; GPO; GPO Dep.

This report discusses the following topics: spectra of heavy open- shell atoms; multiphoton ionization processes in real atoms; angular distribution of photoelectrons ejected from aligned two-electron atoms; and few-electron correlations. (LSP).

32359 (RCNP-T–30) **Proceedings of the workshop on 'spin-charge transfer reaction in atomic collision process' for planning of next period of cascade project.** Osaka Univ., Ibaraki (Japan). Research Center for Nuclear Physics. Mar 1992. 96p. (In Japanese). (CONF-9202134–: Workshop on 'spin-charge transfer reaction in atomic collision process' for planning of next period of cascade project, Ibarakai (Japan), 29 Feb 1992). Order Number DE93704290. Source: OSTI; NTIS; INIS.

This workshop was held on February 29, 1992, and was planned to investigate from the theoretical side the spin-charge transfer reaction which is used for a polarized heavy ion source, the development of which has been advanced in the Research Center for Nuclear Physics. In fiscal year 1992, the plan of installing an ECR ion source, Neomafios-10 GHz, as the AVF cyclotron external incident ion source is in progress. This external incidence system can be used also for the research on various atomic physics, in addition to the research on atomic nucleus physics. In this workshop, heated discussion was carried out on what research on atomic physics can be advanced in the Research Center for Nuclear Physics hereafter, through the investigation of the various problems that the atomic physics from low to high energy holds and new technical development. Particularly, the atomic physics using polarized ions seems to become a very unique study in the world. It seems proper to name this polarized heavy ion incidence system Spin factory. This report was edited based on the copies of the transparencies. (K.I.).

6644 Experimentally Derived Information On Atomic and Molecular Properties

32360 (BNL–47814) **Rotationally resolved photoionization with coherent VUV radiation.** Wiedmann, R.T.; Tonkyn, R.G.; White, M.G. Brookhaven National Lab., Upton, NY (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-920735–3: 10. international conference on vacuum ultraviolet radiation physics, Paris (France), 27-31 Jul 1992). Order Number DE92019257. Source: OSTI; NTIS; INIS; GPO Dep.

Pulsed field ionization (PFI) has been used in conjunction with coherent VUV radiation to investigate the rotational state distributions of molecular cations following single photon ionization. The rotational state distributions for several linear cations (O_2, NO, OH(OD), HCl and N_20) can be interpreted predominately on the basis of the near-threshold, one-electron photoionization dynamics; however, field-induced autoionization is often the dominate ionization pathway for rotational branches involving negative changes in core angular momentum. For photoionization of the H_2X ($X = 0$, S) non-linear triatomic molecules, transitions between asymmetric top levels involving the rotational angular momentum projections, K_a and K_c permit resolution of the photoelectron continua according to symmetry. The observed spectra clearly demonstrate the importance of the non-spherical nature of the molecular ion potential which leads to photoelectron final states which are unexpected from atomic-like analogies.

32361 (LA-UR–92-2320) **Interchain coupling and 3D modeling of trans-polyacetylene.** Bronold, F.; Saxena, A.; Bishop, A.R. Los Alamos National Lab., NM (United States). [1992]. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9205229–1: Center for Nonlinear Studies (CNLS) conference, Los Alamos, NM (United States), May 1992). Order Number DE92018921. Source: OSTI; NTIS; INIS; GPO Dep.

In spite of the success of the SSH model for trans-polyacetylene in interpreting many experimental results (e.g. optical and magnetic properties) there remain some aspects of the real material which are outside the scope of the simple 1D model. Especially ordering phenomena of doped and undoped trans-polyacetylene as well as transport properties (e.g. electronic and thermal conductivity) are beyond a 1D description. There are many attempts to construct a transport theory for this novel class of materials using solitons or polaxons as the basic ingredients. But so far it is not yet clear whether these typical 1D excitations still exist in crystalline transpolyacetylene. Therefore, to clarify the role which intrinsic self-localized nonlinear excitations characteristic of 1D models play in the bulk (3D) material, we study the stability of a polaronic excitation against interchain coupling. As a preliminary step we consider first two coupled t-$(CH)_x$-chains where the π-electrons are allowed to hop from one chain to the other. Then we introduce a 3D generalization of the SSH model and study a polaron in a 3D crystalline environment.

6645 Special Atoms and Molecules

32362 (IC–92/152) **Coherent decay of positronium bose condensate.** Vanyashin, V.S. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 6p. Order Number DE92645303. Source: OSTI; NTIS (US Sales Only); INIS.

The rate of self-stimulated emission of photon pairs by pseudoscalar particles from Bose condensate is calculated. Growing with density this rate exceeds the density independent rate of spontaneous two photon decay at plausible density values of positronium gas, thus opening in principle, the way to the annihilation gamma ray laser realization. (author). 2 refs.

6650 Physics of Condensed Matter

Refer also to citation(s) 31235

32363 (ANL/CP–74717) **Development and verification of an anisotropic turbulence model in the COMMIX-1C/ATM computer code.** Bottoni, M.; Chang, F.C. Argonne National Lab., IL (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-920903–13: International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants, Salt Lake City, UT (United States), 20-24 Sep 1992). Order Number DE92019589. Source: OSTI; NTIS; GPO Dep.

The computer code COMMIX-1C/ATM, which describes single-phase, three-dimensional transient thermofluiddynamic problems, has provided the framework for the extension of the standard k-ε turbulence model to a six-equation model with additional transport equations for the turbulence heat fluxes and the variance of temperature fluctuations. The new model, which allows simulation of anisotropic turbulence in stratified shear flows, is referred to as the Anisotropic Turbulence Model (ATM). The ATM has been verified with numerical computations of stable and unstable stratified shear flow between parallel plates.

32364 (LA-UR-92-1993) **The electronic structure of core states under extreme compressions.** Straub, G.K. Los Alamos National Lab., NM (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9206252-1: 23. summer school on theoretical physics Moscow Engineering Physics Institute (MEPhI), Tver' Oblast (USSR), 1-5 Jun 1992). Order Number DE92017451. Source: OSTI; NTIS; INIS; GPO Dep.

At normal density and for modest compressions, the electronic structure of a metal can be accurately described by treating the conduction electrons and their interactions with the usual methods of band theory. The core electrons remain essentially the same as for an isolated free atom and do not participate in the bonding forces responsible for creating a condensed phase. As the density increases, the core electrons begin to "see" one another as the overlap of the tails of wave functions can no longer be neglected. The electronic structure of the core electrons is responsible for an effective repulsive interaction that eventually becomes free-electron-like at very high compressions. The electronic structure of the interacting core electrons may be treated in a simple manner using the Atomic Surface Method (ASM). The ASM is a first-principles treatment of the electronic structure involving a rigorous integration of the Schroedinger equation within the atomic-sphere approximation. Solid phase wave functions are constructed from isolated atom wave functions and the band width W_l and the center of gravity of the band C_l are obtained from simple formulas. The ASM can also utilize analytic forms of the atomic wave functions and thus provide direct functional dependence of various aspects of the electronic structure. Of particular use in understanding the behavior of the core electrons, the ASM provides the ability to analytically determine the density dependence of the band widths and positions. The process whereby core states interact with one another is best viewed as the formation of narrow electron bands formed from atomic states. As the core-core overlap increases, the bands increase in width and mean energy. In Sec.3 this picture is further developed and from the ASM one obtains the analytic dependence on density of the relative motion of the different bands. Also in Sec. 3 is a discussion of the transition to free electron bands.

32365 (LA-UR-92-2083) **The compactness of front tracking for chromatography electrophoresis and incompressible multiphase flow.** Wendroff, B. Los Alamos National Lab., NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9204181-1: 4. international conference on hyperbolic problems, Taormina (Italy), 3-8 Apr 1992). Order Number DE92017442. Source: OSTI; NTIS; INIS; GPO Dep.

An analysis of the equations of chromatography from the point of view of hyperbolic conservation laws has been reviewed in recent literature. Serre was able to prove that the Lax-Friedrichs difference scheme, Godunov's method, and the viscosity method, have a subsequence converging to a weak solution of the chromatography equations, with no restriction on the size of the initial data. The purpose of this note is to announce that two versions of front tracking can be added to this list. After a brief description of the properties of the chromatography system and a definition of front tracking we give the basic steps of the proof. An example showing the quality of a front tracking solution is given. The equations of idealized electrophoresis and multiphase incompressible flow are very similar to the chromatography equations, but the former have linearly degenerate characteristic field, creating contact discontinuities. In the final section we briefly indicate how our result for chromatography carries over to this case.

32366 (SAND-92-1571C) **Bifurcations in elastic-damaging materials.** Neilsen, M.K. (Sandia National Labs., Albuquerque, NM (United States)); Schreyer, H.L. Sandia National Labs., Albuquerque, NM (United States); New Mexico Univ., Albuquerque, NM (United States).. Dept. of Mechanical Engineering. [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921110-13: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92018818. Source: OSTI; NTIS; GPO Dep.

Continuum damage theories describe the progressive reduction in stiffness and strength of brittle materials resulting from the initiation and growth of microcracks and microvoids. When brittle materials are loaded into the nonlinear regime, they often exhibit localized zones of intense deformation and the eventual formation of macrocracks. Criteria for diffuse and discontinuous bifurcations have previously been developed and used to study the initiation of necking and localization in elastic-plastic materials. In this investigation, the same bifurcation criteria are applied to continuum damage theories. Since the bifurcation criteria depend on the fourth-order tangent modulus tensor, the first step in this investigation is the derivation of the tangent modulus tensor for a general continuum damage theory. An eigenanalysis of the symmetric part of the tangent modulus tensor is then shown to fully characterize the potential diffuse and discontinuous bifurcations associated with a given continuum damage theory.

32367 (UCRL-JC-110652) **Analysis of collective resonances in clusters: Metals and carbon.** Kresin, V.V. Lawrence Livermore National Lab., CA (United States). 1 May 1992. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920402-53: Material Research Society spring meeting, San Francisco, CA (United States), 27 Apr - 2 may 1992). Order Number DE92019582. Source: OSTI; NTIS; GPO Dep.

Dipole photoabsorption spectra of small clusters are analyzed. Two types of systems are considered: Metal clusters and the carbon fullerenes. Both have been found to exhibit strong collective photoabsorption modes associated with the motion of delocalized electrons. We describe analytical results for the resonance frequencies in both spherical (closed-shell metallic, C_{60}) and spheroidal (open-shell metallic, C_{70}) particles. The calculation is based on the techniques of many-body physics (random-phase approximation, sum rules), affords a unified view of the dynamical response of microscopic clusters, and leads to good agreement with experimental data.

6651 Nuclear Techniques in Condensed Matter Physics

Refer also to citation(s) 30465, 30466, 30467, 30468, 30469, 31279, 31314, 32379, 32387

32368 (CEA-CONF-10848) **Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors.** Moser, P. (CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Sciences de la Matiere); La Cruz, R.M. de; Pareja, R. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Sciences de la Matiere. 1991. 5p. (CONF-9109419-: 9. International Conference on Positron Annihilation, Budapest (Hungary), 26-30 Sep 1991). Order Number DE92566621. Source: OSTI; NTIS (US Sales Only); INIS.

The temperature dependence of the positron lifetime has been investigated in as-grown crystals of Zns, ZnSe and ZnTe over the temperature range 8-320 K. Also, isochronal annealing experiments up to 1175 K have been performed on these crystals. Zns and ZnSe crystals have been electron irradiated at room temperature and at 77 K. From the results in as-grown and annealed crystals, the values of (230±3), (240±5) and (266±3) ps are attributed to the positron lifetime in the bulk of Zns, ZnSe and ZnTe, respectively. 8 refs., 3 figs.

32369 (CEA-CONF-10849) **A recovery study of electron irradiated Al-Li alloys.** Moser, P. (CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Sciences de la Matiere); Del

Rio, J.; Diego, N. de. CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Sciences de la Matiere. 1991. 5p. (CONF-9109419–: 9. International Conference on Positron Annihilation, Budapest (Hungary), 26-30 Sep 1991). Order Number DE92566622. Source: OSTI; NTIS (US Sales Only); INIS.

Positron lifetime technique has been used to study the recovery processes in two electron-irradiated Al-Li alloys, having 1.7 and 9.9at%Li. According to the literature Li is in solid solution in the first alloy, while δ' precipitates (Al_3Li) are present in the second one. Isochronal annealing measurements have been performed at 77K from 77 to 400K, and the spectra have been satisfactorily analysed with one component in the whole temperature range. From the results in the as-irradiated samples it is inferred that electrons originate vacancy-Li complexes with a very similar structure in both alloys. The isochronal annealing measurements suggest that the recovery takes place by Li diffusion in the dilute alloy, whereas several processes are involved in the recovery of the concentrated alloy. 5 refs., 1 fig., 1 tab.

32370 (CEA-CONF–10940) **Probing atomic-size defects and free volumes with positron and positronium.** Dolveck, J.Y. (CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Recherche Fondamentale sur la Matiere Condensee); Moser, P.; Guo-Huan Dai. CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Recherche Fondamentale sur la Matiere Condensee. 1992. 8p. (CONF-9203188–: Interdisciplinary Conference on Dielectrics: properties, characterisation and applications, Antibes (France), 23-27 Mar 1992). Order Number DE93701259. Source: OSTI; NTIS (US Sales Only); INIS.

The lifetime measurement of positrons injected in a metal allows to investigate defects of atomic dimension. Many crucial problems in metallurgy have found their solutions by the positron annihilation (PA) techniques for about three decades. Application to semiconductors research has been developed in recent years. Specific theory and analysing method can be used in the studies of the free-volume hole in polymers, the size of the empty spaces being between 0.3 and 1.5 nanometers. In many insulating materials, the diffusing positron can trap an electron and form a metastable positronium (Ps). Like a gas bubble, the Ps atom may diffuse and get trapped by the free-volume hole. When this mechanism is governing, lifetimes over the range of 1-10 ns are well observable and a correspondence exists between the positronium lifetime and minimum diameter of the trapping open space. Example of application is given in a study of polyimide membranes used for gas separation. A good correlation is revealed between the Ps lifetime and H_2 and/or CH_4 permeabilities. Recent progress in polymers research is also reviewed.

32371 (CNIC–00367) **Transport processes of conversion electron in surface layers.** Yu Zhi (Nanjing Univ., JS (China). Dept. of Physics); Xia Yuanfu; Liu Rongchuan. China Nuclear Information Centre, Beijing, BJ (China). Jan 1990. 10p. (In Chinese). (NU–0006.). Order Number DE93603032. Source: OSTI; NTIS (US Sales Only); INIS.

Transportation of 7.3 keV K-conversion electron is simulated by a Monte Carlo method in different depth of iron film (1.0 nm ≈ 300.0 nm). The analysis of results has shown that when the depth of the film is greater than 150 nm, the electron emittance is very low. According to the relationship between the energy and angle and the depth, the energy of emitted electron can be detected, and the information the film depth can be obtained by detecting the angles of emitted electrons. Therefore, angular conversion electron Moessbauer spectroscopy (ACEMS) in iron film seems to be a new way for depth-selected layer investigation.

32372 (INIS-mf–13336) **12th general conference of the condensed matter division of the E.P.S. V.16A.** Velicky, B.; Vorlicek, V.; Zaveta, K. (eds.). Ceskoslovenska Akademie Ved, Prague (Czechoslovakia). Fyzikalni Ustav; European Physical Society, Geneva (Switzerland). 1992 394p. (CONF-920409–: 12. general conference of the Condensed Matter Division of the European Physical Society, Prague (Czechoslovakia), 6-9 Apr 1992). Order Number DE92642678. Source: OSTI; NTIS (US Sales Only); INIS.

The proceedings contain 630 abstracts of contributions and posters presented at the conference, out of which 35 have been inputted in INIS. They deal with the application of the dispersion and diffraction of X-rays and neutrons to the investigation of the structure of matter, crystals in particular; with spin-lattice relaxation and superlattices; and with electron spin resonance, nuclear magnetic resonance and Moessbauer spectroscopy. (M.D.).

32373 (INIS-mf–13336, pp. 238) **Neutron diffraction study of $Sr_xBa_{1-x}Nb_2O_6$ crystals.** Balagurov, A.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics); Sangaa, D.; Savenko, B.N.; Prokert, F. Ceskoslovenska Akademie Ved, Prague (Czechoslovakia). Fyzikalni Ustav; European Physical Society, Geneva (Switzerland). 1992. 394p. (CONF-920409–: 12. general conference of the Condensed Matter Division of the European Physical Society, Prague (Czechoslovakia), 6-9 Apr 1992). In *12th general conference of the condensed matter division of the E.P.S. V.16A.* Order Number DE92642678. Source: OSTI; NTIS (US Sales Only); INIS.

Abstract only. CRYSTAL STRUCTURE/neutron diffraction; BARIUM COMPOUNDS; ELASTIC SCATTERING; FERROELECTRIC MATERIALS; NIOBATES; PHASE TRANSFORMATIONS; STRONTIUM COMPOUNDS; SUPERLATTICES

32374 (SAND–91-2592C) **An NMR study of the occupation of C_{60} interstitial sites by oxygen molecules.** Assink, R.A.; Loy, D.A.; Schirber, J.E.; Morosin, B. Sandia National Labs., Albuquerque, NM (United States). [1991]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920402–50: Material Research Society spring meeting, San Francisco, CA (United States), 27 Apr - 2 may 1992). Order Number DE92019436. Source: OSTI; NTIS; INIS; GPO Dep.

The 13_C NMR of FCC C_{60} under magic angle spinning (MAS) conditions yields linewidths on the order of 1 Hz at fields of 4.7 T. The spectrum consists of a primary resonance at 143.7 ppm and a minor peak shifted 0.7 ppm downfield. The intensity of the minor resonance relative to the primary resonance was found to vary from 0.6 to 5.5 % depending on the sample history. The downfield shift obeys Curie's law and is attributed to the Fermi contact coupling interaction between paramagnetic oxygen molecules and all 60 carbon atoms of rapidly rotating adjacent C_{60} molecules. Exposure of the sample to 1 kbar oxygen for 1 3/4 hours resulted in a spectrum of 7 evenly spaced resonances corresponding to 0 to 6 of the adjacent octahedral interstitial sites being filled with oxygen molecules. At ambient pressure, the oxygen diffused out of the lattice on time scales ranging from hours to days.

6653 Interactions Between Beams and Condensed Matter

Refer also to citation(s) 31226, 32372, 32470, 32479

32375 (CEA-CONF–10490) **Electronic excitations in metallic systems: from defect annihilation to track formation.** Dunlop, A.; Lesueur, D. CEA-Ecole Polytechnique, 91 - Palaiseau (France). Lab. d'Etudes des Solides Irradies. 1991. 7p. (CONF-9111258–: 13. Werner Brandt Workshop on the Interaction of Charged Particles with Matter, Nara (Japan), 9-17 Nov 1991). Order Number DE92566719. Source: OSTI; NTIS (US Sales Only); INIS.

This paper presents an overview of the effects of high electronic energy deposition in metallic targets irradiated with GeV heavy ions. The main result of these investigations is that high electronic excitations lead to various and sometimes conflicting effects according to the nature of the target: - partial annealing of the defects induced by elastic collisions, - creation of additional disorder, - phase transformation (tracks formation and amorphization), - anisotropic growth. These different effects of high electronic energy deposition in metallic targets are probably manifestations at various degrees of the same basic energy transfer process between the excited electrons and the target atoms. Up to now no theoretical model explains these effects. 24 refs.

32376 (CRN-CPR–91-03) **Study of high energy ion implantation of boron and oxygen in silicon.** Thevenin, P. Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires; Strasbourg-1

Univ., 67 (France). Jun 1991. 134p. (In French). Order Number DE93701369. Source: OSTI; NTIS (US Sales Only); INIS.

Three aspects of high energy (0.5-3 MeV) light ions ($^{11}B^+$ and $^{16}O^+$) implantation in silicon are examined: (1)Spatial repartition; (2) Target damage and (3) Synthesis by oxygen implantation of a buried silicon oxide layer.

32377 (IPNO-DRE–91-16) **Impact of slow gold clusters on various solids: Non linear effects in secondary ion emission.** Benguerba, M. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire); Brunelle, A.; Della-Negra, S.; Depauw, J.; Joret, H.; Beyec, Y. Le; Blain, M.G.; Schweikert, E.A. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 51p. Order Number DE92570060. Source: OSTI; NTIS (US Sales Only); INIS.

A liquid metal ion source has been installed on a pulsed ion gun. The time of flight (TOF) spectra of the pulsed beam were recorded. With the gold source several cluster ions (up to 10 atoms in the cluster) and doubly charged ions were identified in the ion beam TOF spectra. With a second pulsation, single cluster ions can be selected as projectiles for secondary ion TOF mass spectrometry. The secondary ion emission induced by cluster impact from a variety of targets (organic, CsI, metallic) was studied. A large enhancement of yield is observed by comparison to single atomic ion impact (e.g., a factor of 30 between Au_3^+ and Au^+). The secondary ion yields increase nonlinearly with the number of constituents in the cluster. A comparison with other types of clusters and also fission fragments of ^{252}Cf has been performed. The rate of secondary emission stimulated by cluster is similar to the secondary ion yield induced by fission fragments. (author) 47 refs., 18 figs., 5 tabs.

32378 (IPNO-DRE–91-19) **Ion desorption phenomena induced by various types of multiply charged projectiles and by photons on solid surfaces.** Beyec, Y. Le. Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire. 1991. 43p. (CONF-9108199–: Latin American school of physics, Caxambu (Brazil), 4-24 Aug 1991). Order Number DE92570063. Source: OSTI; NTIS (US Sales Only); INIS.

Ion desorption experiments are described in two regions of primary ion velocities corresponding to two distinct classes of interaction mechanism. At low speeds, atomic collisions take place, at higher speeds than the electron velocity, electronic collisions occur. Experiments with fast ions above 0.2 MeV/u are described, using ^{32}S and ^{235}U ions obtained in a cyclotron and a linear accelerator. Emission of H^+ ions from solid surfaces is measured and analyzed, and applied to the determination of the charge state of a fast ion in a solid. Experiments using single atomic and polyatomic, keV ions, and organic and CsI cluster ions as projectiles are also presented. Finally, laser desorption is discussed. (R.P.) 81 refs., 27 figs., 2 tabs.

32379 (LBL–32305) **14th international symposium on molecular beams.** Lawrence Berkeley Lab., CA (United States). [1992]. 439p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States); National Science Foundation, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9206174–: 14. international symposium on molecular beams, Pacific Grove, CA (United States), 7-12 Jun 1992). Order Number DE92017012. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses research being conducted with molecular beams. The general topic areas are as follows: Clusters I; reaction dynamics; atomic and molecular spectroscopy; clusters II; new techniques; photodissociation & dynamics; and surfaces.

32380 (LIYaF–90-1608) **Influence of neutron spin orientation on Laue diffraction in a non-centrosymmetric crystal.** Alekseev, V.L.; Voronin, V.V.; Lapin, E.G.; Leushkin, E.K.; Rumyantsev, V.L.; Fedorov, V.V. AN SSSR, Leningrad (Russian Federation). Inst. Yadernoj Fiziki. 1990. 12p. (In Russian). Order Number DE92645515. Source: OSTI; NTIS (US Sales Only); INIS.

Pendular fringes for the different spin-t - interplanar electric field orientations were measured. The theory of the effect is given. It is shown that for some crystal thicknesses the pendular frings should disappear for the cases of neutrons polarized along the electric field and for unpolarized neutrons. This effect is due to rotation in the opposits directions of the spins for different kinds of the neutron Bloch waves. When the angle between the spins becomes equal to π the waves stop to interfere and the pendular frings disappears. 5 refs.; 2 figs.; 1 tab.

6654 Quantum Physics Aspects of Condensed Matter

Refer also to citation(s) 31323

665410 Superconductivity

Refer also to citation(s) 31248, 31433

32381 (ANL/CP–76653) **Landau level quantization and superconductivity.** Akera, H. (Hokkaido Univ., Sapporo (Japan). Faculty of Engineering); MacDonald, A.H.; Norman, M.R. Argonne National Lab., IL (United States). Jul 1992. 10p. Sponsored by USDOE, Washington, DC (United States); Midwest Superconductivity Consortium (United States). DOE Contract W-31109-ENG-38 ;FG02-86ER45247. (CONF-9208110–1: 33. Yamada conference on the application of high magnetic fields in semiconductor physics, Chiba (Japan), 3-7 Aug 1992). Order Number DE92019028. Source: OSTI; NTIS; GPO Dep.

A microscopic calculation of vortex-lattice states in two-dimensional electron systems at strong magnetic fields is made taking fully the Landau level quantization into account within the mean field scheme. Results of the order parameter and the local density of states are presented both in the limit of pairing in a single Landau level and in the semiclassical regime of weaker fields and differences from the Abrikosov vortex state are discussed.

32382 (BNL–52302, pp. 17-21) **Intermetallic superconductors - The state of development in 1991.** Forsyth, E. (Brookhaven National Lab., Upton, NY (United States)). Brookhaven National Lab., Upton, NY (United States). 27 Sep 1991. (CONF-9105133–: Workshop on technology issues of superconducting magnetically levitated (MAGLEV) transportation systems, Upton, NY (United States), 23-24 May 1991). In *Workshop on technology issues of superconducting Maglev transportation systems.* 142p. Order Number DE92002288. Source: OSTI; NTIS; INIS.

The commercial fabrication of intermetallic superconductors has reached a high degree of maturity in the past thirty years. The only significant, commercial requirement for superconducting wire is the construction of magnetic resonance imaging (MRI) devices for medical diagnosis. In addition to this demand there are one-time projects such as a high energy particle accelerators which often need considerable quantities of superconducting material over the few years of construction. R and D projects also provide a fluctuating market for superconducting materials, in the past the projects have included power apparatus such as generators, motors, energy storage and transmission cables, and magnets for experimental fusion reactors. Superconducting magnetically levitated trains have undergone full scale trials in Japan and Germany. This is by no means a comprehensive list of all the possible applications. Virtually all the devices requiring a magnetic field to be produced by superconducting windings have used NbTi wire, but a few experimental Nb_3Sn high field magnets have been constructed. In the case of these materials commercial vendors can provide a high degree of quality assurance on such characteristics as critical current, coupling effects and mechanical tolerances. This paper discusses the market for intermetallic and ceramic superconductors, their fabrication properties, applications, and cost.

32383 (CNIC–00446) **Development for specific heat measuring apparatus of high T_c superconductor in 80 $\approx$ 200 K temperature range.** Li Caiyun (Southwest Inst. of Physics, Leshan, SC (China)); Ren Lianzhi; Chen Rongguang; Gao Lixia; Teng Qiuan; Li Huanxing. China Nuclear Information Centre, Beijing, BJ (China). Nov 1990. 6p. (In Chinese). (SIP–0043.). Order Number DE93603071. Source: OSTI; NTIS (US Sales Only); INIS.

An apparatus for specific heat measurement is described. It can be used for measuring solid materials by heat leakage method. The specific heat of a standard sample α-Al_2O_3 had been measured. It corresponds to one of NBS and the measured deviation is better than ±1.8%. The accuracy is ±3% to measured superconducting sample $YBa_2Cu_3O_{7-x}$.

32384 (CNIC–00470) **Flux creep in fluorine-doping Bi-Pb-Sr-Ca-Cu-O bulk superconductor.** Cao Xiaowen (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics); Feng Shangshen; Gao Xiaohui; Wu Xiaoling; Yang Hui; Yin Zhoulan; Wei Qin. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 9p. (In Chinese). (ASIPP–0023.). Order Number DE93603072. Source: OSTI; NTIS (US Sales Only); INIS.

The magnetization and the flux creep in the fluorine-doping Bi-Pb-Sr-Ca-Cu-O bulk superconductor have been experimentally studied. The experimental results exhibit some new behaviours and suggest that S dM/dlnt $\propto H^{1/2}$ for the fields 100 Oe $< H <$ 1000 Oe; $U_0(H) \propto \exp(-H/30)$ for the fields below 150 Oe and $U_0(H) \propto H^{-\alpha}$ with $\alpha = 3/2$ for the fields above 150 Oe.

32385 (CNIC–00472) **Characteristic of the flux pinning at intergrain boundaries in bulk Bi-Pb-Sr-Ca-Cu-O superconductors.** Wang Yugui (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics); Yang Yu; Xiong Xiaozhong; Yuan Songliu; Wang Shunxi. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 10p. (ASIPP–0024.). Order Number DE93603073. Source: OSTI; NTIS (US Sales Only); INIS.

The magnetization measurement shows that there are two kinds of different intergrain boundaries in the sintered $Bi_{1.8}\ Pb_{0.34}\ Sr_{1.86}\ Ca_2\ Cu_3O_y$ superconductors. One has nearly no pinning force for flux line, the other can trap some flux line in the low field range where a pinning current may be sustained. When the applied field is removed, most of the remanent magnetization comes from the intergrain boundaries. The area of hysteresis loop at low field and the remanent magnetization for the cold-pressed bulk samples are significantly increased. Cold pressing results in aligning the grain orientation and raising the packing density, both of which enhanced intergrain coupling. The J_c value of 1040 A/cm^2 at H = 0 and 150 A/cm^2 at H = 1 k Oe are obtained. The flux creep along the intergrain boundaries and the pinning potential energy U_0 for the coldpressed samples are also discussed.

32386 (CNIC–00515) **Preparation of Y-Ba-Cu-O superconducting film above liquid nitrogen temperature.** Liu Jianmin (Southwest Inst. of Physics, Leshan, SC (China)); Gao Lixia; Tian Ying; Ma Mei. China Nuclear Information Centre, Beijing, BJ (China). Aug 1991. 6p. (In Chinese). (SIP–0046.). Order Number DE93603142. Source: OSTI; NTIS (US Sales Only); INIS.

The process for preparing Y-Ba-Cu-O system high T_c superconducting film using nitrates CVD pyrolysis method is introduced. The thickness of film is about 25 $\approx$ 70 μm, and its critical temperature is 79.37 K.

32387 (CONF-9205236–3) **Neutron scattering studies of the spin dynamics in $La_{2-x}Sr_xO_4$.** Hayden, S.M. (Bristol Univ. (United Kingdom). H.H. Wills Physics Lab.); Mason, T.E.; Aeppli, G.; Cheong, S.W.; Mook, H.A.; Fisk, Z. Oak Ridge National Lab., TN (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Conference on phase separation in cuprate superconductors; Sicily (Italy); 6-12 May 1992. Order Number DE92019952. Source: OSTI; NTIS; INIS; GPO Dep.

Inelastic neutron scattering has determined the modulation vectors and correlation lengths for the low-energy incommensurate magnetic fluctuations observed in $La_{2-x}Sr_xCu0_4$ for $x \gtrsim 0.075$. On entering the superconducting state a strong suppression of the low-energy fluctuations is observed. These results are discussed with reference to a two-dimensional band structure model.

32388 (ECN-C–91-067) **Ac losses test on Nb_3Sn strands.** Eikelboom, J.A. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Oct 1991. 24p. Contract no. 91-267. Order Number DE93603143. Source: OSTI; NTIS; INIS.

This research has been performed under NET contract during period March-August 1991.

Measurements reported here are a continuation of the research performed under previous contract with NET (NET contract no./ 88-186, ECN report C–91-018). The purpose is to measure fundamental ac loss properties of superconducting wires and composite cables. Several firms were contracted by NET to manufacture niobium-tin wires that can meet current NET specifications with respect to hysteresis losses and coupling losses. Due to planned dismantling of the test facilities at ECN, experiments had to take place before August 1991. Due to the delay in the delivery of the strand material by industry only one specific wire manufactured by Teledyne Wah Chang Albany has been measured. The wire samples were prepared and heat treated at ECN. Specific questions about the coupling loss behaviour of full size cabled conductors remained after the conclusion of the research under the previous NET contract. A large difference was observed between cable samples with and without the steel jacket. Possible explanations are a different compaction of the cable or coupling currents flowing by way of the jacket. In order to investigate this matter two additional cable samples were manufactured and were measured at ECN. The conductor for the US-DPC coil was also tested. (author). 24 refs.; 24 figs.; 8 tabs.

32389 (IC–92/136) **Nonclassical disordered phase in the strong quantum limit of frustrated antiferromagnets.** Ceccatto, H.A. (International Centre for Theoretical Physics, Trieste (Italy)); Gazza, C.J.; Trumper, A.E. International Centre for Theoretical Physics, Trieste (Italy). Jul 1992. 10p. Order Number DE92645691. Source: OSTI; NTIS (US Sales Only); INIS.

The Schwinger boson approach to quantum helimagnets is discussed. It is shown that in order to get quantitative agreement with exact results on finite lattices, parity-breaking pairing of bosons must be allowed. The so-called $J_1 - J_2 - J_3$ model is studied, particularly on the special line $J_2 = 2J_3$. A quantum disordered phase is found between the Neel and spiral phases, though notably only in the strong quantum limit S = 1/2, and for the third-neighbor coupling $J_3 \geq 0.038\ J_1$. For spins $S \geq 1$ the spiral phase goes continuously to an antiferromagnetic order. (author). 19 refs, 3 figs.

32390 (LA-UR–92-1844) **Bipolaronic charge density waves, polaronic spin density waves and high $T_c$superconductivity.** Aubry, S. Los Alamos National Lab., NM (United States). [1992]. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9205236–2: Conference on phase separation in cuprate superconductors, Sicily (Italy), 6-12 May 1992). Order Number DE92017403. Source: OSTI; NTIS; GPO Dep.

At large enough electron phonon coupling, the existence of bipolaronic, polaronic and mixed states is rigorously proven for the adiabatic Holstein model at any dimension and any band filling. The ground-state is one of them which then prove the existence of insulating Bipolaronic Charge Density Waves. The role of the quantum lattice fluctuations is analysed and found to be neglegible in that regime but to become essential in case of phonon softening then favoring the occurence of superconductivity. When a strong Hubbard term is also present, the bipolarons break into polorons and the ground state is expected to be a polaronic spin density wave. If the repulsive Hubbard term is comparable to the electron-phonon coupling, the energy for breaking a bipoloron into two polarons can become small and we get instead of these two degenerate structures, a pait of polarons bounded by a spin resonance which we call "spin resonant bipolaron". This resonant bipolaron is still strongly bound, but the role of the quantum lattice fluctuations becomes now very important and yields a sharp broadening of the bandwidth of this resonant bipolarona. Thus, the strong quantum character of these resonant bipolarons could prevent their localization into real space structures which could be insulating bipolaronic CDWs or polaronic SDWS, then favoring the formation of a superconducting coherent state with a possible high T_c.

32391 (LA-UR–92-2864) **Transport and magnetization currents in BSCCO/Ag tapes.** McHenry, M.E. (Los Alamos National Lab., NM (United States)); Kung, P.J.; Maley, M.P.; Willis, J.O.; Coulter, J.Y. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-920802–1: Applied superconductivity conference, Chicago, IL (United States), 23-28 Aug 1992). Order Number DE92040357. Source: OSTI; NTIS; INIS; GPO Dep.

A (Bi,Pb)SrCaCuO-2223/Ag tape has been produced by thermomechanical processing. Transport J_c's have been measured between H = 0 and 7 T and T = 7 to 75 K. Magnetization currents,

$J(H,T)$, have been determined for similar temperatures and fields (0 to 5 T) oriented parallel and orthogonal to the thickness of the tape. Dimensional scaling arguments show that flux penetrates most quickly along the tape thickness direction (for fields parallel to the tape plane and therefore the ab planes of the textured BSCCO grains). This implies that the anisotropy ratio of J_c and J_{ab} is reduced in tapes as compared with single crystals consistent with predictions of the brick wall model. Also measured were the H dependence of magnetization currents, ${J^{H\perp c}}_{ab}$ and ${J^{H\parallel c}}_{ab}$ and effective pinning potentials, $U_{eff}(J)$, for similar field orientations. Fast magnetic relaxation causes an exponential field dependences $J/J_c \propto \exp(-H/H_0)$ of transport and magnetization currents consistent with a divergent $U_{eff}(J)$ as $J \rightarrow 0$. Temperature dependences for H_0 for transport and magnetization measurements are interpreted in terms of different time scales (or voltage criteria); for H_0 in two field orientations are explained by a directionally dependent $U_{eff}(J_{ab})$.

32392 (SAND–92-0216C) **Steady-state cooling of a high-temperature superconducting motor.** Dykhuizen, R.C. (Sandia National Labs., Albuquerque, NM (United States)); Bickel, T.C.; Baca, R.G.; Kempka, S.N.; Skocypec, R.D.; Edick, J.D.; Schiferl, R.F.; Jordan, H.E. Sandia National Labs., Albuquerque, NM (United States). [1992]. 18p. Sponsored by USDOE, Washington, DC (United States); Electric Power Research Inst., Palo Alto, CA (United States). DOE Contract AC04-76DP00789. (CONF-921110–4: Winter annual meeting of the American Society of Mechanical Engineers, Anaheim, CA (United States), 8-13 Nov 1992). Order Number DE92012624. Source: OSTI; NTIS; GPO Dep.

Development of a high-temperature, superconducting, synchronous motor for large applications (>1000 hp) could offer significant electrical power savings for industrial users. Presently 60% of all electric power generated in the United States is utilized by electric motors. A large part of this power is utilized by motors 1000 hp or larger. The use of high-temperature superconducting materials with critical temperatures above that of liquid nitrogen (77 K) in the field winding would reduce the losses in these motors significantly, and therefore, would have a definite impact on the electrical power usage in the US. These motors will be 1/3 to 1/2 the size of conventional motors of similar power and, thus, offer potential savings in materials and floor space. The cooling of the superconducting materials in the field windings of the rotor presents a unique application of cryogenic engineering. The rotational velocity results in significant radial pressure gradients that affect the flow distribution of the cryogen. The internal pressure fields can result in significant nonuniformities in the two-phase flow of the coolant. A multiphase flow computer model of the cryogenic cooling is developed to calculate the boiling heat transfer and phase distribution of the nitrogen coolant in the motor. The model accounts for unequal phase velocities and nonuniform cooling requirements of the rotor. Model results indicate a factor of 10 difference in the flow through axial coolant channels as a function of radius. The effect of this flow distribution needs to be accounted for in the design of the motor. Continuing improvements on the model will allow the investigation of the transient thermal issues associated with localized quenching of the superconducting components of the motor.

665420 Superfluidity

Refer also to citation(s) 32057

32393 (DOE/ER/52149–4) **Fluid dynamics of supercritical helium within cable-in-conduit conductors: Progress report.** Van Sciver, S.W. Wisconsin Univ., Madison, WI (United States). 1 Jul 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER52149. Order Number DE92019516. Source: OSTI; NTIS; GPO Dep.

The enclosed report summarizes work carried out under DOE/MFE Support, during the past four years. Emphasis is placed on progress within the last year. Results of experiments on pressure drop and heat transfer within several Cable-in-Conduit Conductors are described. These results are compared to models for flow in similar geometries. The work provides a basis for design of magnets using the CIC Conductor Concept.

70 PLASMA PHYSICS AND FUSION

7003 Plasma Physics and Fusion Research

Refer also to citation(s) 32063, 32448, 32458, 32473, 32508

32394 (CEA-CONF–10856) **Experimental program on the 20 TW laser system.** Watteau, J.P. CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France). 1991. 20p. (CONF-9111127–: 33. annual Division of Plasma Physics/American Physical Society (DPP/APS) meeting, Tampa, FL (United States), 4-8 Nov 1991). Order Number DE92566725. Source: OSTI; NTIS (US Sales Only); INIS.

Pulses of 20 TW have been generated at 1064 nm using the Chirped Pulse Amplification technique coupled to a 90 mm output aperture powerful Nd:silicate glass amplification line. This system delivers 60 J in a chirped pulse of 600 ps duration with a capacity of maintaining 3.5 nm output band width. These chirped pulses are compressed to 1.2 ps with an energy of 24 J using large holographic gold coated 1740 lines/mm diffraction gratings. In a first step, the beam is focused on target using an aspherical 640 mm focal lens. The maximum measured irradiance is limited to 10^{18} W/cm^2 by auto focusing effects in the air pass and in the lens; higher values up to 10^{19} W/cm^2 will need propagation of the compressed beam in vacuum and focusing by reflective optics. The first experiments deal with laser-plasma coupling X-ray generation and influence of power contrast. Further plans included multiple Compton scattering and X-ray laser generation. Some theoretical work on ionization processes and particle acceleration are also presented.

32395 (CNIC–00328) **The suppression of multiple tearing modes using helical field.** Wang Maoquan (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics). China Nuclear Information Centre, Beijing, BJ (China). Dec 1989. 19p. (In Chinese). (ASIPP–0014.). Order Number DE93602961. Source: OSTI; NTIS (US Sales Only); INIS.

The suppression of the tearing modes by resonant helical field (RHF) is analyzed and calculated numerically. The nonlinear interactions between the tearing modes were considered. It is shown that the couplings of different modes can or can't destabilize the tearing modes. This is related to certain conditions. Because of the interactions the $l = 2$ RHF can stabilize all modes and the $l = 3$ RHF in the case of multiple tearing modes is noneffective, only in the single mode approximation it can suppresses the $m = 3$ mode.

32396 (CNIC–00369) **The calculations of magnetic diffusion constant and Kolmogorov entropy in a stochastic field region.** Wang Maoquan (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics). China Nuclear Information Centre, Beijing, BJ (China). Nov 1989. 18p. (In Chinese). (ASIPP–0018.). Order Number DE93602951. Source: OSTI; NTIS (US Sales Only); INIS.

The magnetic field within a stochastic field region is statistically described. A Hamiltonian governing the motion of system and a distribution function describing the probability distribution of equilibrium magnetic line of force are proposed. The perturbation distribution function can be obtained by solving Liouville equations one by one, and the magnetic diffusion constant and Kolmogorov entropy can be calculated by using distribution function. The numerical results show that the diffusion constant and entropy obtained by this method are in good agreement with those of direct dynamical computations.

32397 (CNIC–00381) **Excitation adjustable system of toroidal field waveform for tokamak HL-1.** Ren Juqian (Southwest Inst. of Physics, Leshan, SC (China)); Yu Xianrong; Xie Yongzhong. China Nuclear Information Centre, Beijing, BJ (China). Nov 1989. 12p. (In Chinese). (SIP–0039.). Order Number DE93602944. Source: OSTI; NTIS (US Sales Only); INIS.

The closed-loop adjusting system of the toroidal field waveform is described. Technical measures have been taken to improve the stability of the system and the repetitiveness of wave adjustment. Meanwhile the wiring and technical characteristics of the system are discussed and the level of the system attained is compared with that of the original system.

32398 (CNIC–00435) **The time-space structure evolution of tokamak plasma under the mutual interactions of tearing mode with transport process.** Zhang Cheng (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics); Deng Xiaohua; Huo Yuping. China Nuclear Information Centre, Beijing, BJ (China). Jul 1990. 14p. (In Chinese). (ASIPP–0020.). Order Number DE93602962. Source: OSTI; NTIS (US Sales Only); INIS.

A theoretical study of the evolution of tearing modes in tokamak plasma is presented. Combining the tearing mode with a 1-D transport code, computer simulations are conducted. The result shows that the transport process plays an important role in the development of the macro-instability. Under the mutual interaction of macro-instability and transport process, the MHD pattern of tokamak presents various space and time structures. That also gives rise to the time and space behavior of other plasma parameters such as temperature and density.

32399 (CNIC–00466) **Characteristics of low-q discharge on HT-6B tokamak.** Li Guoxiang (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics); Li Linzhong; Xie Jikang. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 8p. (In Chinese). (ASIPP–0022.). Order Number DE93602963. Source: OSTI; NTIS (US Sales Only); INIS.

When operating at low q region, the plasma in HT-6B tokamak still has well confinement property. The disruption at $q(a) \leq 2.0$ has some features. There are three kinds of disruptions i.e. major disruption, soft disruption and sawtooth-like disruption. The strong sawtooth oscillation leads to broaden the distribution of plasma parameters that causes the m 2/n = 1 kink mode increasing on the edge of the plasma. The low q disruption is closely related to the m = 2/n = 1 mode increasing and sawtooth disruption. It will be possible to operate a tokamak with high β in low q region if the low q disruption is governed by controlling the distribution of the plasma parameters and sawtooth oscillation.

32400 (CNIC–00475) **Hard X-ray measurement on HT-6B tokamak.** Yin Xiejin (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics); Li Linzhong; Li Wuping; Zhou Licheng; Zhao Junyu; Liang Rongqing. China Nuclear Information Centre, Beijing, BJ (China). May 1991. 5p. (In Chinese). (ASIPP–0025.). Order Number DE93602964. Source: OSTI; NTIS (US Sales Only); INIS.

The hard X-ray intensity has regularly being monitored in various discharge conditions on HT-6B tokamak. In low-q region operation, the emitted hard X-ray spectra at different phases were measured and compared. The comparison of sawtooth oscillations of hard X-rays and soft X-rays was completed. Recently, in the low hybrid current driven (LHCD) experiment both hard X-rays emitted from bulk plasma and bremsstrahlung out of thick targets on the limiter were simultaneously observed. The preliminary results show that the mechanisms of producing hard X-rays and bremsstrahlung are different.

32401 (CNIC–00493) **Observation of spatial resolution of ECR plasma on the MM-2 magnetic mirror.** Duan Shuyun (Southwest Inst. of Physics, Leshan, SC (China)); Gu Biao; Guan Weishu; Cheng Shiqing; Liu Rong; Chen Kangwei; Shang Zhenkui. China Nuclear Information Centre, Beijing, BJ (China). Apr 1991. 9p. (In Chinese). (SIP–0045.). Order Number DE93602948. Source: OSTI; NTIS (US Sales Only); INIS.

The measuring method and results of the ECR plasma properties taken from hard X-ray pinhole camera on the MM-2 magnetic mirror are presented. This non-destructive imaging method can directly display the spatial distribution of hot electron plasma. A frame of clear picture could be taken at one shot of discharge. The relationships between emission intensity and discharge parameters are also shown by experimental pictures.

32402 (CONF-920419–Absts.) **International Sherwood fusion theory conference.** Los Alamos National Lab., NM (United States). [1992]. 230p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. From International Sherwood fusion theory conference; Santa Fe, NM (United States); 6-8 Apr 1992. Order Number DE92018756. Source: OSTI; NTIS; INIS; GPO Dep.

This report contains the abstracts of the papers being presented at the International Sherwood Fusion Theory Conference. (LSP).

32403 (CONF-920913–7) **Theoretical basis for advanced plasma configurations.** Jardin, S.C. (Princeton Univ., NJ (United States). Plasma Physics Lab.); Chance, M.S.; Cowley, S.C.; Ignat, D.W.; Pomphrey, N.; Kessel, C.; Manickam, J.; Monticello, D.A.; Perkins, F.W.; Reiman, A.H.; Rutherford, P.H.; Valeo, E.J.; Bhattacharjee, A.; laconColumbia Univ., New York, NY (United States). [1992]. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-89ER53297 ;AC02-76CH03073 ;FG02-89ER51124. From 14. international conference on plasma physics and controlled nuclear fusion research; Wuerzburg (Germany); 30 Sep - 7 oct 1992. Order Number DE92019493. Source: OSTI; NTIS; INIS; GPO Dep.

Short communication. TOKAMAK DEVICES/bootstrap current; CURRENT DENSITY; MHD EQUILIBRIUM; DESIGN

32404 (CONF-9209181–1) **Biasing experiments on the Advanced Toroidal Facility.** Uckan, T. (Oak Ridge National Lab., TN (United States)); Isler, R.C.; Jernigan, T.C.; Lyon, J.F.; Mioduszewski, P.K.; Murakami, M.; Rasmussen, D.A.; Wilgen, J.B.; Aceto, S.C.; Zielinski, J.J. Oak Ridge National Lab., TN (United States). [1992]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From International Atomic Energy Agency (IAEA) technical committee meeting on tokamak plasma biasing; Montreal (Canada); 8-10 Sep 1992. Order Number DE92040033. Source: OSTI; NTIS; INIS; GPO Dep.

Biasing experiments have been carried out in 1 T plasmas with ~200 kill of electron cyclotron heating (ECH) in the current-fire Advanced Toroidal Facility (ATF) torsatron. Two rail limiters, one at the top and one at the bottom of the device, located at the last closed flux surface (LCFS), are, biased at positive and negative potentials with respect to the vacuum vessel. When the limiters are positively biased at up to 300 V and the plasma density is controlled with a significantly reduced gas feed, the Hα radiation from both the limiter and the wall drops, indicating reduced particle recycling as a result of improved particle confinement. For bias voltages around +100 V, there is almost no change of plasma stored energy W_p, but W_p then drops with the higher biasing voltages. Positive biasing has caused the core plasma density profile to become peaked and the electric field to' become more negative inside the LCFS. At the same time, edge plasma fluctuations are reduced significantly and their power spectrum becomes less broad. The propagation direction of these electrostatic fluctuations reverses to the ion diamagnetic direction, and their wavelengths become longer. The resulting fluctuation-induced particle flux is also reduced. Power deposition on the limiters is lower as a result of reduced edge plasma density and temperature. Negative biasing yields somewhat less improvement in the particle confinement while having almost no apparent effect on W_p or on the core and the edge plasma density and temperature profiles. Simultaneous measurements of the plasma potential profile indicate almost no significant change. Biasing has almost no effect on the intrinsic impurity levels in the plasma.

32405 (CONF-921125–1) **Performance of a plasma fluid code on the Intel parallel computers.** Lynch, V.E. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States)); Carreras, B.A.; Drake, J.B.; Leboeuf, J.N.; Liewer, P. Oak Ridge National Lab., TN (United States). [1992]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From ACM/IEEE supercomputing conference; Minneapolis, MN (United States); 14-21 Nov 1992. Order Number DE92011680. Source: OSTI; NTIS; INIS; GPO Dep.

One approach to improving the real-time efficiency of plasma turbulence calculations is to use a parallel algorithm. A parallel algorithm for plasma turbulence calculations was tested on the Intel iPSC/860 hypercube and the Touchtone Delta machine. Using the 128 processors of the Intel iPSC/860 hypercube, a factor of 5 improvement over a single-processor CRAY-2 is obtained. For the Touchtone Delta machine, the corresponding improvement factor is 16. For plasma edge turbulence calculations, an extrapolation of the present results to the Intel σ machine gives an improvement factor close to 64 over the single-processor CRAY-2.

32406 (CTH-IEFT-PP–1992-01) **Vortices in nonuniform upper-hybrid field.** Davydova, T.A. (Inst. for Nuclear Research, Ukrainian Academy of Sciences, Kiev (Ukraine)); Vranjes, J.

Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics. 1992. 20p. Order Number DE92645304. Source: OSTI; NTIS; INIS.

The equations describing the interaction of an upper-hybrid pump wave with small low-frequency density perturbations are discussed under assumption that the pump is spatially nonuniform. The conditions for the modulational instability are investigated. Instead of a dispersion relation, describing the growth of perturbations in the case of an uniform pump, in our case of nonuniform pump a differential equation is obtained and from its eigenvalues are found the instability criteria. Taking into account the slow-frequency self-interaction terms some localized solutions similar to dipole vortices are found, but described by analytic functions in all space. It is shown that their characteristic size and speed are determined by the pump intensity and its spatial structure. (au).

32407 (CTH-IEFT-PP–1992-02) **Vortices with a nonuniform group velocity.** Vranjes, J. (Inst. for Electromagnetic Field Theory, Chalmers Univ. of Technology, Goeteborg (Sweden)); Weiland, J. Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics. 1992. 9p. Order Number DE92645305. Source: OSTI; NTIS; INIS.

An equation describing vortices produced by a spatially nonuniform upper-hybrid pump wave, in an inhomogeneous plasma, is derived. The vortex group velocity is assumed to be spatially nonuniform and the consequences of this assumption are discussed. (au).

32408 (CTH-IEFT-PP–1992-03) **Plasma temperature and density dynamics including particle and heat pinch effects.** Wilhelmsson, H. Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics. 1992. 13p. Order Number DE92645306. Source: OSTI; NTIS; INIS.

The spatial and temporal evolutions of temperature and density of plasmas, governed by coupled nonlinear diffusion equations with source terms and finite boundary effects, are studied by means of a central expansion technique for 'bell-shaped' plasma profiles. Four coupled first order nonlinear equations in time are obtained for the amplitudes (central values) and widths of the temperature and density distributions. The roles played by the various processes, considering also particle and heat pinch effects, are discussed and the conditions for possible equilibria are formulated. (au).

32409 (CTH-IEFT-PP–1992-05) **Nonlinear shaping of a two-dimensional ultrashort ionizing pulse.** Sergeev, A. (Institute of Applied Physics, Nizhnyj Novgorod (Russia)); Vanin, E.; Stenflo, L.; Anderson, D.; Lisak, M.; Quiroga-Teixeiro, M.L. Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics. 1992. 17p. Order Number DE92645307. Source: OSTI; NTIS; INIS.

A theoretical description of ultrashort ionizing wave pulses is presented by means of two different models where the ionization rate increases or decreases, respectively, as a function of the electric field amplitude. We show that the pulse evolves either into a horseshoe or a horn-type structure in the time-space domain. In some parameter regions the intensity of the pulse can also increase. (au).

32410 (DOE/ER/13727–T2) **Self-generated stochastic heating in an rf discharge: Annual progress report, May 15, 1991–May 14, 1992.** Lichtenberg, A. California Univ., Berkeley, CA (United States). Electronics Research Lab. [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-87ER13727. Order Number DE92018558. Source: OSTI; NTIS; GPO Dep.

We have studied the nonlinear dynamics of stochastic heating arising from the reflection of electrons from moving sheaths as an underlying mechanism for electron power deposition in r.f. discharges. We examined the dynamics of the electron collision with the sheaths in the regime in which the sheath motion is small compared to the average electron velocity to de rive a mop that describes the electron motion. We have shown that for high frequency, ($\omega/2\pi \gtrsim 50$MHz), the electrons will strike the moving wall with random phase. At low pressures this stochasticity is an intrinsic property of the dynamics. The stochastic electron heating leads to a power law electron distribution. The stochastic heating was determined in both the slow sheath and fast sheath velocity regimes assuming an incident Maxwellian distribution.

32411 (DOE/ER/53198–201) **Measurement of current density fluctuations and ambipolar particle flux due to magnetic fluctuations in MST.** Shen, Weimin. Wisconsin Univ., Madison, WI (United States). Aug 1992. 119p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER53198. Order Number DE92041013. Source: OSTI; NTIS; INIS; GPO Dep.

Studies of magnetic fluctuation induced particle transport on Reversed Field Pinch plasmas were done on the Madison Symmetric Torus. Plasma current density and current density fluctuations were measured using a multi-coil magnetic probes. The low frequency (f<50 kHz) current density fluctuations are consistent with the global resistive tearing instabilities predicted by 3-D MHD simulations. At frequencies above 50 kHz, the magnetic fluctuations were detected to be localized with a radial correlation length of about 1–2 cm. These modes are locally resonant modes since the measured dominant mode number spectra match the local safety factor q. The net charged particle flux induced by magnetic fluctuations was obtained by measuring the correlation term $<\tilde{j}_{\parallel}\ \tilde{B}_r>$. The result of zero net charged particle loss was obtained, meaning the flux is ambipolar. The ambipolarity of low frequency global tearing modes is satisfied through the phase relations determined by tearing instabilities. The ambipolarity of high frequency localized modes could be partially explained by the simple model of Waltz based on the radial average of small scale turbulence.

32412 (DOE/ER/53198–202) **Current density fluctuations, nonlinear coupling, and transport in MST.** Prager, S.C.; Almagri, A.F.; Assadi, S.; Cekic, M.; Chapman, B.E.; Crocker, N.; Den Hartog, D.J.; Dexter, R.N.; Fiksel, G.; Fonck, R.J.; Henry, J.S.; Hokin, S.A.; Holly, D.J.; Ji, H.; Rempel, T.D.; Sarff, J.S.; Scime, E.; Shen, W.; Sidikman, K.L.; Sprott,.Wisconsin Univ., Madison, WI (United States). Dept. of Physics. Sep 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER53198. (IAEA-CN–56/C-3-1;CONF-920913–10: 14. international conference on plasma physics and controlled nuclear fusion research, Wuerzburg (Germany), 30 Sep - 7 oct 1992). Order Number DE92041012. Source: OSTI; NTIS; INIS; GPO Dep.

New information on magnetic fluctuations and transport in toroidal devices has been obtained in the MST reversed field pinch through measurement of nonlinear coupling of three waves in k-space, and measurement of current density fluctuations. Measurements of nonlinear coupling of magnetic fluctuations reveals that (1) two poloidal mode number m = 1 modes couple strongly to an m = 2 mode, (2) toroidal mode coupling is broad extending up to n = 20, (3) these features agree with predictions for tearing fluctuations from a nonlinear MHD code, (4) during a sawtooth crash the number of modes involved in nonlinear interactions increases dramatically and the k-spectrum broadens simultaneously. Measurements of current density fluctuations over the outer 20% of the minor radius reveal that (1) low frequency fluctuations are consistent with tearing modes, (2) high frequency fluctuations are localized turbulence which maintains resonance with the equilibrium field as q changes with radius, (3) particle transport from magnetic fluctuations is ambipolar (i.e., $<\delta j_{\parallel} B_r> = O$).

32413 (DOE/ER/53198–203) **Anomalous ion heating and superthermal electrons in the MST reversed-field pinch.** Hokin, S.; Almagri, A.; Assadi, S.; Cekic, M.; Chapman, B.; Chartas, G.; Crocker, N.; Cudzinovic, M.; Den Hartog, D.J.; Dexter, R.; Fiksel, G.; Fonck, R.; Henry, J.; Holly, D.; Prager, S.; Rempel, T.; Sarff, J.; Scime, E.; Shen, W.; Sprott, C.; Stoneking,.Wisconsin Univ., Madison, WI (United States). Dept. of Physics. Sep 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER53198. (IAEA-CN–56/C-3-2;CONF-920913–9: 14. international conference on plasma physics and controlled nuclear fusion research, Wuerzburg (Germany), 30 Sep - 7 oct 1992). Order Number DE92041011. Source: OSTI; NTIS; INIS; GPO Dep.

Anomalous ion heating and superthermal electron populations have been studied in the MST reversed-field pinch. The ion heating is much stronger than that given by classical electron-ion friction, and is particularly strong during dynamo bursts. The heating displays a marked density dependence: in a 350-kA discharge with a maximum $\bar{n} = 0.9 \times 10^{13}$ cm^{-3}, T_i rises sharply as $\bar{n}$ drops below $0.4 \times 10_{13}$ cm^{-3} late in the discharge. Superthermal electrons are produced in the core, with temperatures of T_{eh}, = 350–700 eV while the bulk core temperature is T_{eo} = 130–230 eV. The fraction of superthermal electrons decreases with increasing density, from 40% at $\bar{n} = 0.5 \times 10^{13}$ cm^{-3} to 8% at $\bar{n} = 1.9 \times 10^{13}$ cm^{-3} at I = 350 kA. However, data with similar plasma parameters but higher oxygen impurity content had a lower T_{eh} and higher hot fraction. The edge superthermal electron distribution is well fit by a drifted bi-Maxwellian distribution with $T_{\parallel} \sim T_{e0}$ and relative drift speed $v_d/v_{th} = 0.4$. With the assumption that the parallel heat flux measured with a pyroelectric probe is carried by superthermal electrons, the measured electron current is consistent with $T_{\perp} \sim T_{es} \sim T_{e0}/3$ and accounts for over half of the total edge parallel current measured with magnetic probes.

32414 (DOE/ER/53223–180) **Tokamak equilibria and transport based on Grad's thirteen moment description.** Tippett, M.K. New York Univ., NY (United States). Courant Inst. of Mathematical Sciences. Jun 1992. 103p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER53223. (MF–124). Order Number DE92019960. Source: OSTI; NTIS; INIS; GPO Dep.

In this thesis, I study collisional transport of a hot magnetically confined plasma in a tokamak. The weakly collisional plasma is modeled by Grad's two-fluid thirteen moment equations. This model provides a better treatment of the stresses and the heat fluxes than do collisional fluid models such as Braginski's. Using physical parameters for a typical tokamak, I estimate the orders of magnitude of various effects. I obtain a reduced system by neglecting small terms in the two-fluid thirteen moment equations. This reduced model includes small particle flows, pressure anisotropy and temperature variation within flux surfaces. The reduced model is compared with standard fluid models. To understand better the behavior of solutions of this system, I expand the solution in a formal series in powers of the small parameter $(m_e/m_i)^{1/4}$. Flux coordinates are used to solve the equations in a general axisymmetric geometry. In lowest order, the equilibrium solution consists of a number of arbitrary flux functions together with a Grad-Shafranov equation relating the poloidal flux and the toroidal current. The energy dynamics of the system is complicated and requires determining the solution to high order. As corrections to the lowest order solution are calculated, the equilibrium is extended to successively longer time scales until on the time scale $\tau_e m_i/m_e$, time independent solutions are in general not possible. I calculate the time evolution of the lowest order solution on the time scale $\tau m_i/m_e$, a time scale consistent with experiment.

32415 (DOE/ER/53223–194) **Plasma properties: Progress report for 1991.** Weitzner, H. New York Univ., NY (United States). Courant Inst. of Mathematical Sciences. Aug 1992. 42p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER53223. Order Number DE92019982. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics: MHD Equilibrium and Stability; MHD Transport; Statistical Analysis; Edge Physics Studies; Wave Propagation; Basic Plasma Physics; and Space Plasma Physics.

32416 (DOE/ER/53225–T3) **Application of computer modeling to fusion research: Progress report, November 1, 1991–October 31, 1992.** Dawson, J.M. California Univ., Los Angeles, CA (United States). Dept. of Physics. [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-86ER53225. Order Number DE92019203. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses the following topics: gyrokinetic modeling; gyrokinetic physics problems run; boot strap current; and investigations of parallel computing. (LSP).

32417 (DOE/ER/53279–2) **Plasma Science Committee (PLSC) and study on new opportunities in plasma science and technology: Technical progress report, July 15, 1991–May 31, 1992.** National Academy of Sciences, Washington, DC (United States). Board on Physics and Astronomy. [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-88ER53279. Order Number DE92019507. Source: OSTI; NTIS; INIS; GPO Dep.

The Plasma Science Committee (PLSC) of the National Research Council (NRC) is charged with monitoring the health of the field of plasma science in the United States. Accordingly, the Committee identifies and examines both broad and specific issues affecting the field. Regular meetings, teleconferences, briefings from agencies and the scientific community, the formation of study panels to prepare reports, and special symposia are among the mechanisms used by the PLSC to meet its charge. This progress report presents a review of PLSC activities from July 15, 1991 to May 31, 1992. The details of prior activities are discussed in earlier reports. This report also includes the status of activities associated with the PLSC study on opportunities in plasma science and technology. During the above period, the PLSC has continued to track and participate in, when requested, discussions on the health of the field. Much of the perspective of the PLSC has been presented in the recently-published report Research Briefing on Contemporary Problems in Plasma Science. That report has served as the basis for briefings to representatives of the federal government as well as the community-at-large. In keeping with its charge to identify and highlight specific areas for scientific and technological opportunities, the PLSC completed publication of the report Plasma Processing of Materials: Scientific and Technological Opportunities and launched a study on new opportunities in plasma science and technology.

32418 (DOE/ET/53088–556) **Fast ion-driven Bernstein instabilities.** Chen, K.R. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. 20 Jul 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-80ET53088. (IFSR–556). Order Number DE92019393. Source: OSTI; NTIS; INIS; GPO Dep.

We investigate a new mechanism, the two-energy-stream cyclotron instability, for fast ions (e.g., fusion products) to drive electrostatic waves and to slow down. The instability comes from a relativistic effect, which dominates conventional phase overtaking as the axial phase velocity exceeds the speed of light. Both a single particle model and a dispersion relation are developed in order to illuminate the physics insights and scaling laws. We present numerical results and discuss nonlinear processes. The mechanism is essential for the dynamics of the fast ions in both D-D and D-T devices.

32419 (DOE/ET/53088–560) **Nonlinear studies of m = 1 modes in high-temperature plasmas.** Aydemir, A.Y. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. Jul 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-80ET53088. (IFSR–560). Order Number DE92019395. Source: OSTI; NTIS; INIS; GPO Dep.

Nonlinear evolution of the m = 1 mode is examined in high-temperature plasmas where the mode is in the semi-collisional or collisionless regime. Unlike the resistive m = 1 mode, both the semi-collisional mode, with a very weak resistivity dependence, and the collisionless mode, driven by finite electron inertia, can be robustly unstable in today's large tokamaks. And unlike the finite-$\Delta'(m \geq 2)$ tearing modes, the nonlinear evolution of which is collisional, both the semi-collisional and collisionless m = 1 modes exhibit nonlinearly enhanced growth rates that far exceed their linear values, thus making their nonlinear evolution collisionless; this accelerated growth of a collisionless m = 1 mode may explain the fast sawtooth-crashes observed in large tokamaks.

32420 (DOE/ET/53088–561) **The electrostatic wake of a superthermal test electron in a magnetized plasma.** Ware, A.A.; Wiley, J.C. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. Jul 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-80ET53088. (IFSR–561). Order Number DE92019394. Source: OSTI; NTIS; INIS; GPO Dep.

The electrostatic potential is determined for a test electron with $v_{\parallel} \gg v_{Te}$, in a uniform magnetized plasma ($\omega_{ce} \gg \omega_{pe}$). In the frame of the test electron, part of the spatially oscillatory potential has spherical symmetry over the hemisphere to the rear of the electron and is zero ahead of the electron. A second part of different character, which makes the potential continuous at the plane containing the electron, is oscillatory in the radial direction but decreases almost monotonically in the axial direction.

32421 (DOE/ET/53088–565) **Fusion, magnetic confinement.** Berk, H.L. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. 6 Aug 1992. 109p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-80ET53088. (IFSR–565). Order Number DE92019876. Source: OSTI; NTIS; INIS; GPO Dep.

An overview is presented of the principles of magnetic confinement of plasmas for the purpose of achieving controlled fusion conditions. Sec. 1 discusses the different nuclear fusion reactions which can be exploited in prospective fusion reactors and explains why special technologies need to be developed for the supply of tritium or ^{3}He, the probable fuels. In Sec. 2 the Lawson condition, a criterion that is a measure of the quality of confinement relative to achieving fusion conditions, is explained. In Sec. 3 fluid equations are used to describe plasma confinement. Specific confinement configurations are considered. In Sec. 4 the orbits of particle sin magneti and electric fields are discussed. In Sec. 5 stability considerations are discussed. It is noted that confinement systems usually need to satisfy stability constraints imposed by ideal magnetohydrodynamic (MHD) theory. The paper culminates with a summary of experimental progress in magnetic confinement. Present experiments in tokamaks have reached the point that the conditions necessary to achieve fusion are being satisfied.

32422 (EUR-CEA-FC–1442) **Lower hybrid current drive experiments in Tore Supra.** Moreau, D. TORE SUPRA Team. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. Dec 1991. 38p. (CONF-9111127–: 33. annual Division of Plasma Physics/American Physical Society (DPP/APS) meeting, Tampa, FL (United States), 4-8 Nov 1991). Source: OSTI; NTIS (US Sales Only); INIS.

Two large multi junction launchers have allowed to couple up to 6 MW to the plasma. The current drive efficiency was about 2 x 10^{19} Am^{-2}/W with LH power alone at a volume-averaged electron temperature of 1.4 keV. Experiments with combined LHCD and ion cyclotron resonant heating allowed to inject up to 7.5 MW into the plasma. The electron energy content followed fairly well the Rebut-Lallia scaling law. At $n_e = 1.5 \times 10^{19}$ m^{-3}, sawteeth were suppressed and m = 1 MHD oscillations appeared. The central electron temperature then reached 8 keV for 3.6 MW injected. LH power modulation experiments performed at $n_e = 4 \times 10^{19}$ m^{-3} showed a delayed central electron heating despite the off-axis creation of suprathermal electrons, thus ruling out the possibility of direct heating through central wave absorption. Successful pellet fueling of a partially LH driven plasma was obtained, in which 28 successive pellets could penetrate up to half radius as in ohmic discharges, with 50 to 80% of the pellet content deposited in the plasma. First attempts to combine LHCD with ergodic divertor discharges showed that, when the plasma edge was subject to a radial magnetic perturbation smaller than the ergodicity threshold, a strong stationary radiation (MARFE) was triggered, locked near the inner wall. The radiated power then amounted to 90% of the total input power with no indication of a radiative collapse.

32423 (EUR-CEA-FC–1443) **Lower hybrid wave coupling in Tore Supra through multi junction launchers.** Litaudon, X.; Berger By, G.; Bibet, P.; Bizarro, J.P.; Capitain, J.J.; Carrasco, J.; Goniche, M.; Hoang, G.T.; Kupfer, K.; Magne, R.; Moreau, D.; Peysson, Y.; Rax, J.M.; Rey, G.; Rigaud, D.; Tonon, G. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. Jan 1992. 46p. Source: OSTI; NTIS (US Sales Only); INIS.

The TORE SUPRA Lower Hybrid Current Drive experiments (8 MW/3.7GHz) use large phased waveguide arrays, to couple the waves to the plasma. These launchers are based on the multi junction principle. Extensive coupling measurements have been performed in order to study the Radio-Frequency (RF) characteristics of the plasma loaded antennae and are reported. Measurements of the plasma scattering coefficients of the antennae show good agreement with those obtained from the linear coupling theory (SWAN code). Global reflection coefficients of a few percents have been measured in a large range of edge plasma densities or antenna positions, and up to a maximum injected RF power density of 45MW/m^2. When the plasma is pushed against the inner wall of the chamber, the reflection coefficient was found to remain low up to distances of the order of 10 cm. The coupling measurements allow us to deduce the experimental power spectra radiated by the antennae when all their modules are fed simultaneously with variable phases. An assessment of the multi junction launcher as a viable antenna for high power transmission with good coupling characteristics and spectrum control is thus made.

32424 (EUR-CEA-FC–1444) **The Beasts' model of percolative transport.** Dubois, M.A.; Beaufume, P.; Fromont, B. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. Dec 1991. 17p. Source: OSTI; NTIS (US Sales Only); INIS.

A class of nonlinear dynamical systems is introduced: it is aimed to be a tool in order to study anomalous transport and percolation phenomena. We study a simple example of this system, and explore different regimes of transport exhibited.

32425 (EUR-CEA-FC–1445) **Anharmonicity in resonant perturbations and its effect on stochasticity extension.** Hennequin, P.; Dubois, M.A.; Nakach, R. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. Dec 1991. 12p. Source: OSTI; NTIS (US Sales Only); INIS.

We analyse the effect of the separatrix shape on stochasticity onset and on diffusion in the two waves system, and in particular the role of the separatrix angle at the X-point. Introducing anharmonicity in the expression of the perturbation, we can adjust this angle, and eventually have it go to zero. We show that, in this latter case, stochasticity appears much sooner and that the diffusion coefficient is strongly enhanced. Applications to specific physical problems are discussed.

32426 (GA-A–21007) **Fusion programs in Applied Plasma Physics: Contract extension report, October 1, 1991–January 31, 1992.** General Atomics, San Diego, CA (United States). Jul 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-89ER53277. Order Number DE92019639. Source: OSTI; NTIS; INIS; GPO Dep.

Magnetic Fusion Research Program.

The Applied Plasma Physics (APP) program at General Atomics (GA) described here includes four major elements: (a) Applied Plasma Physics Theory Program, (b) Alpha Particle Diagnostic, (c) Edge and Current Density Diagnostic, and (d) Fusion User Service Center (USC). The objective of the APP theoretical plasma physics research at GA is to support the DIII-D and other tokamak experiments and to significantly advance our ability to design a commercially-attractive fusion reactor. We categorize our efforts in three areas: magnetohydrodynamic (MHD) equilibria and stability; plasma transport with emphasis on H-mode, divertor, and boundary physics; and radio frequency (rf). The objective of the APP alpha particle diagnostic is to develop diagnostics of fast confined alpha particles using the interactions with the ablation cloud surrounding injected pellets and to develop diagnostic systems for reacting and ignited plasmas. The objective of the APP edge and current density diagnostic is to first develop a lithium beam diagnostic system for edge fluctuation studies on the Texas Experimental Tokamak (TEXT). The objective of the Fusion USC is to continue to provide maintenance and programming support to computer users in the GA fusion community. The detailed progress of each separate program covered in this report period is described in the following sections.

32427 (INP-MSU–90-58-204) **Observation of fast neutrons and tritium during electrolysis of heavy water.** Kuz'min, R.N.; Sakharov, E.M.; Shvilkin, B.N.; Kuprin, A.P.; Revokatov, P.O. Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1990. 12p. (NIIYaF-MGU–90-58-204.). Order Number DE92645357. Source: OSTI; NTIS (US Sales Only); INIS.

Fast neutron and tritium was observed from Pd and Ti electrodes during electrolysis in D_2O. The quality estimation of effect is suggested. 4 refs.; 4 figs.

32428 (JAERI-M–92-057) **Numerical analysis of gas puff modulation experiment on JT-60U.** Nagashima, Keisuke (Japan Atomic Energy Research Inst., Naka, Ibaraki (Japan). Naka Fusion Research Establishment); Sakasai, Akira. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 14p. Order Number DE93703577. Source: OSTI; NTIS; INIS.

In tokamak transport physics, source modulation experiments are one of the most effective methods. For an analysis of these modulation experiments, a simple numerical method was developed to solve the general transport equations. This method was applied to gas puff modulation experiments on JT-60U. From the comparison between the measured and calculated density perturbations, it was found that the particle diffusion coefficient is about 0.8 m^2/sec in the edge region and 0.1-0.2 m^2/sec in the central region. (author).

32429 (JINR-D–13-91-200) **Correlation experiments on checking the existence of low temperature nuclear fusion in titanium and zirconium deuterides.** Artyukhov, V.I. (Moskovskij Khimiko-Tekhnologicheskij Inst., Moscow (Russian Federation)); Bystritskij, V.M.; Gilev, A.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 14p. Order Number DE92645358. Source: OSTI; NTIS (US Sales Only); INIS.

The paper deals with checking the hypothesis of low temperature nuclear dd-fusion (LTF) in titanium and zirconium deuterides. The technique of detection of neutrons and acoustic emission resulting from saturation of the above materials with deuterium was used. The experiments with titanium and zirconium deuteride samples were carried out in the temperature range from 80 to 400 K. In all exposures the neutron counting was not observed to exceed the background level, and the time correlation between the moments when neutrons and acoustic transducer signals appear was not found either. The upper limits of the dd-fusion rate in titanium and zirconium deuterides per deuteron pair were estimated at the 90% confidence level on the assumption of LTF existence: $\lambda_{dd}{}^{Ti} \leq 10^{-25}$ $s^{-1}x(dd)^{-1}$, $\lambda_{dd}{}^{Zr} \leq 3x10^{-25}$ $s^{-1}x(dd)^{-1}$. 32 refs.; 8 figs.

32430 (JINR-D–15-91-289) **Observation of neutron bursts in saturation of titanium with deuterium by means of D_2O electrolysis.** Artyukhov, V.I. (Moskovskij Khimiko-Tekhnologicheskij Inst., Moscow (Russian Federation)); Bystritskij, V.M.; Gilev, A.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 14p. Order Number DE92645359. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes a correlation experiment on investigation of low-temperature nuclear dd-fusion during saturation of titanium with deuterium through electrolysis of heavy water D_2O. The experiments with cathodes of chemically pure titanium and of titanium coated with a 0.4μm nickel layer (mass of titanium 26 g) were carried out. Emission of neutrons in the form of separate bursts was observed in the experiments with the nickel-coated cathode. The neutron emission density in the burst was found to be $I_n=(3.6 \pm 0.9)x10^4 s^{-1}$. 17 refs.; 6 figs.

32431 (JINR-D–15-91-290) **Experimental observation of neutron emission insaturation of titanium chips with gaseous deuterium.** Artyukhov, V.I. (Moskovskij Khimiko-Tekhnologicheskij Inst., Moscow (Russian Federation)); Bystritskij, V.M.; Gilev, A.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1991. 10p. Order Number DE92645360. Source: OSTI; NTIS (US Sales Only); INIS.

An experiment on investigation of low-temperature nuclear dd-fusion in saturation of titanium chips (86%+6%Al+6%V+2%Sn) with gaseous deuterium was carried out. Emission of neutrons (produced in dd-fusion reactions) in the form of separate sporadic bursts was observed. The neutron emission density in the burst was found to be $I_n=(3.0 \pm 0.9)x10^4 s^{-1}$. The neutron burst duration was estimated to be $\tau \approx 300 \mu s$. The measurements were carried out while the target was naturally heated from the liquid nitrogen temperature (78 K) to room temperature (300)K. 7 refs.; 4 figs.

32432 (LA-UR–92-2390) **Measurements of excess heat from a Pons-Fleischmann type electrolytic cell using palladium sheet.** Storms, E.K. Los Alamos National Lab., NM (United States). [1992]. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9210151–1: 3. cold fusion technology conference, Nagoya (Japan), 21-25 Oct 1992). Order Number DE92018604. Source: OSTI; NTIS; GPO Dep.

Two pieces of palladium sheet were loaded with deuterium in a Pons-Fleischmann type electrolytic cell and measurements were made of heat production. One sheet produced a steady increase in excess power that reached 7.5 watts (20% of input power) before the study was interrupted. A second similar sheet from a different batch of palladium did not produce any measurable excess power. There was a difference between the loading behavior, the maximum stoichiometry, and the presence of excess volume in the deuteride made from these materials. The first sheet contained 0.8% excess volume after deloading from D/Pd=0.82 to D/Pd=0.73, and the second sheet contained 13.5 % excess volume while at D/Pd=0.75. The high excess volume in the latter case is an indication of internal cracks.

32433 (ORNL/TM–12075) **Effects of limiter biasing on the ATF torsatron.** Uckan, T. (Oak Ridge National Lab., TN (United States)); Baylor, L.R.; Bell, J.D.; Bigelow, T.S.; England, A.C.; Harris, J.H.; Isler, R.C.; Jernigan, T.C.; Lyon, J.F.; Ma, C.H.; Mioduszewski, P.K.; Murakami, M.; Rasmussen, D.A.; Wilgen, J.B.; Aceto, S.C.;.Oak Ridge National Lab., TN (United States). Sep 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92041363. Source: OSTI; NTIS; INIS; GPO Dep.

Positive limiter biasing on the currentless Advanced Toroidal Facility (ATF) torsatron produces a significant increase in the particle confinement with no improvement in the energy confinement. Experiments have been carried out in 1-T plasmas with ~400 kill of electron cyclotron heating ECM. Two rail limiters located at the last closed flux surface (LCFS), one at the top and one at the bottom of the device, are biased at positive and negative potentials with respect to the vessel. When the limiters are positively biased at up to 300 V, the density increases sharply to the ECH cutoff value. At the same time, the H_α radiation drops, indicating that the particle confinement improves. When the density is kept constant, the H_α radiation is further reduced and there is almost no change in the plasma stored energy. Under these conditions, the density profile becomes peaked and the electric field becomes outward-pointing outside the LCFS and more negative inside the LCFS. In contrast, negative biasing yields some reduction of the density and stored energy at constant gas feed, and the plasma potential profile remains the same. Biasing has almost no effect on the intrinsic impurity levels in the plasma.

32434 (PPPL–2850) **Observation of ballooning instabilities with medium toroidal mode number in high temperature tokamak plasmas.** Nagayama, Y. (Princeton Univ., NJ (United States). Plasma Physics Lab.); Manickam, J.; Fredrickson, E.D.; Bell, M.; Budny, R.V.; Cavallo, A.; Janos, A.C.; McGuire, K.M.; Taylor, G.; Yamada, M.; Sabbagh, S.A.; Mauel, M.E.; Navratil, G.A. Princeton Univ., NJ (United States). Plasma Physics Lab. Aug 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073 ;FG02-89ER53297. Order Number DE92018962. Source: OSTI; NTIS; INIS; GPO Dep.

A beta degradation event in a high βp, TFTR tokamak plasma is analyzed with X-ray and electron cyclotron emission (ECE) imaging techniques. Medium-n (toroidal mode number) instabilities with ballooning characteristics are observed near and within the q =1.5 surface during a slow degradation in the plasma β and precede a sudden partial collapse in the central plasma pressure. This is the first reported observation of a ballooning instability in the interior of a large, collisionless tokamak plasma.

32435 (PPPL-CFP–2654) **Transport in a stochastic magnetic field.** White, R.B. (Princeton Univ., NJ (United States). Plasma Physics Lab.); Wu, Yanlin; Rax, J.M. Princeton Univ., NJ (United States). Plasma Physics Lab. [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. (CONF-9207112–2: 2. symposium on plasma dynamics, Trieste (Italy), 8-10 Jul 1992). Order Number DE92018445. Source: OSTI; NTIS; INIS; GPO Dep.

Collisional heat transport in a stochastic magnetic field configuration is investigated. Well above stochastic threshold, a numerical solution of a Chirikov-Taylor model shows a short-time nonlocal regime, but at large time the Rechester-Rosenbluth effective diffusion is confirmed. Near stochastic threshold, subdiffusive behavior is observed for short mean free paths. The nature of this subdiffusive behavior is understood in terms of the spectrum of islands in the stochastic sea.

32436 (TRITA-EPP--91-02) **Preliminary observations of electromagnetic radiation from plasma in presence of a double layer.** Lindberg, L. Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics. Oct 1991. 20p. Order Number DE92645314. Source: OSTI; NTIS; INIS.

In earlier laboratory investigations of a double layer a plasma region with an intense, spontaneous HF-generation was observed by means of internal HF-probes. The region was located 50-200 Debyelengths from the double layer, on the high potential side. It was concluded that the HF-field is generated by beam-plasma interaction, and can best be classified as electrostatic Langmuir waves. Such a wave field should in first approximation not radiate electromagnetic waves. The present paper reports on electromagnetic radiation in the near-field region outside the plasma, measured by means of small, electrostatically shielded loop-probes. At the electron gyro frequency, a broad peak is seen in the spectrum, with spatial maximum outside the region of internal HF-generation. Unexpectedly the azimuthal magnetic HF-component is stronger than the axial component. At the plasma frequency (higher than the gyro frequency, and less well defined) a broad range of HF emission is seen, extending to the upper hybrid frequency. The spatial maximum is outside the region of intense interaction, and the axial component dominates, suggesting oscillations at the upper hybrid frequency. Groups of intensity peaks are also seen near the upper hybrid frequency. Probe design, shielding and calibration technique is described. (au).

7004 Fusion Technology

Refer also to citation(s) 30940, 30960, 30983, 31225, 31482, 31483, 32216, 32412, 32433

32437 (ANL/FPP/TM--258) **User's manual for the ARMLID (Argonne metallic lithium/isotopic dilution) tritium assay system.** Porges, K.G.; Bretscher, M.M.; Bennett, E.F.; Dilorio, G.; Mattas, R.F.; Lewandowski, E.F. Argonne National Lab., IL (United States). Aug 1992. 152p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92040950. Source: OSTI; NTIS; INIS; GPO Dep.

The Argonne Metallic Lithium - Isotopic Dilution (ARMLID) system described in this report, originally developed at ANL for other purposes, was recently redeployed to measure the tritium production rate (TPR) in a series of US/Japanese collaborative fusion blanket integral experiments, involving large assemblies of fusion breeder blanket materials that were irradiated with a fusion neutron source at FNS/JAERI, Japan. Whereas previous uses of the ARMLID scheme involved just a few samples, its application infusion blanket TPR mapping called for large sample numbers per experiment, implying a commensurate scale of sample fabrication and encapsulation, on one hand, and tritium extraction and counting on the other hand. To shorten the time required for these various tasks, yet still yield reliable and accurate results, both the sample fabrication - encapsulation facility and the tritium extraction system had to be extensively revised from original versions that were designed for accuracy, but not necessarily for speed. The present report describes overall revisions in sufficient detail to serve as a User's Manual for this facility, and/or suggest how a new system might be put together. Either possibility may develop in the near future, in support of ITER design studies. Preliminary and partial descriptions of various aspects and features of the system were presented orally, in the course of annual ANL/JAERI/UCLA "workshops", over the last 34 years, as well as elsewhere.

32438 (ANL/FPP/TM--260) **Modeling of tritium behavior in Li$_2$O.** Billone, M.C.; Attaya, H.; Kopasz, J.P. Argonne National Lab., IL (United States). Fusion Power Program. Aug 1992. 72p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92041358. Source: OSTI; NTIS; INIS; GPO Dep.

The TIARA and DISPL2 codes are being developed at Argonne National Laboratory to predict tritium retention and release from lithium ceramics under steady-state and transient conditions, respectively. Tritium retention and release are important design and safety issues for tritium-breeding blankets of fusion reactors. Emphasis has been placed on tritium behavior in Li$_2$O because of the selection of this ceramic as a first option for the ITER driver blanket and because of the relatively good material properties data base for Li$_2$O. Models and correlations for diffusion, surface desorption/adsorption, and solubility/precipitation of tritium in Li$_2$0 have been developed based on well-controlled laboratory data from as-fabricated and irradiated samples. With the models and correlations, the codes are validated to the results of in-reactor purge flow tests. The results of validation of TIARA to tritium retention data from VOM-15H, EXOTIC-2, and CRITIC-1 are presented, along with predictions of tritium retention in BEATRIX-II. For DISPL2, results are presented for tritium release predictions vs. data for MOZART, CRITIC-1, and BEATRIX-II. Recommendations are made for improving both the data base and the modeling to allow extrapolation with reasonable uncertainty levels to fusion reactor design conditions.

32439 (CEA-CONF--10857) **ICF related experiments at CEL-V.** Andre, M.; Coutant, J.; Dautray, R.; Decroisette, M.; Duborgel, B.; Lachkar, J.; Ouvry, J.; Schurtz, G.; Watteau, J.P. CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France). 1991. 23p. (CONF-9110326--: European conference on laser interaction with matter (ECLIM), Warsaw (Poland), 21-25 Oct 1991). Order Number DE92566726. Source: OSTI; NTIS (US Sales Only); INIS.

Implosion experiments performed at Centre d'Etudes de Limeil-Valenton in the indirect drive scheme using the two-beams Nd glass laser facility Phebus at the energy level $\simeq$ 6 kJ (blue light) are presented. A final density of compressed DT close to 100 ρ_0 has been obtained. Phebus has also been equipped with an optical fibre oscillator, to study the effect of a smoothing technique on coupling processes: at 0.53 μm, absorption efficiency is increased by $\simeq$15-20%. With the eight beams Octal laser, hydrodynamic instabilities development in accelerated planar targets has been investigated both for direct and indirect drive. Atomic physics in laser plasmas is also deeply studied; a particular effort has been made on absorption spectroscopy which is a powerful diagnostic of ionization dynamics in cold and dense plasmas. In order to reach fuel ignition conditions, much powerful lasers, in the range of megajoule, will be needed. Their design needs further technological developments in order to reduce the capital cost. At Limeil, we work mainly on high damage threshold optical coatings, using the sol-gel process, high quality - low cost mirror fabrication, using the replica technics and incoherent laser pulse generation for beam smoothing.

32440 (CEA-CONF--10938) **Technology and component development for a closed tritium cycle.** Hircq, B. (CEA Centre d'Etudes de Bruyeres-le-Chatel, 91 (France)); Penzhorn, R.D.; Anderson, J.; Haange, R.; Meikle, A.; Naruse, Y. CEA Centre d'Etudes de Bruyeres-le-Chatel, 91 (France). 1991. 27p. (CONF-9106310--: 2. international symposium on fusion nuclear technology and exposition, Karlsruhe (Germany), 2-7 Jun 1991). Order Number DE93701263. Source: OSTI; NTIS (US Sales Only); INIS.

A brief summary on recent advances in the field of tritium technology concerning the most important subsystems of the fuel cycle of a fusion reactor, i.e. the plasma exhaust pumping system, the exhaust gas clean up system, the isotope separation, the tritium storage and the tritium extraction from a blanket is provided. Experimental results, single component developments, and technical tests including those with relevants amounts of tritium that constitute the basis of proposed integral process concepts are described. 48 refs.

32441 (CEA-CONF--10939) **LIPSIE experiment: Pb17Li irradiation in water loop with on line tritium measurements.** Thevenot, G. (CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Mecanique et de Technologie); Lefevre, F.; Estrade, J.; Roche, M.; Flament, T.; Terlain, A. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Mecanique et de Technologie. 1991. 7p. (CONF-911111--: International conference on fusion reactor materials, Clearwater, FL

(United States), 17-22 Nov 1991). Order Number DE93701261. Source: OSTI; NTIS (US Sales Only); INIS.

Within the framework of the European Fusion Technology Programme a water cooled lithium-lead blanket is developed. One of the crucial issues is the tritium production control. The main object of the LIPSIE experiment is to study tritium permeation through externally water cooled steel walls and the possibility of tritium extraction generated in Pb17Li eutectic alloy by bubbling device. The ISABELLE 4 loop in the OSIRIS reactor is used for Pb17Li irradiation with tritium measurements on line in the coolant water and in the capsule.

32442 (CEA-CONF--10946) **The european programme on negative ion beam development.** Pamela, J. (Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee); Hemsworth, R.; Jacquot, C.; Hopman, H.; Holmes, A.J.T. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. 1991. 5p. (CONF-9111260--: I.A.E.A. Technical Committee Meeting on Negative Ion Based Neutral Beam Injector, Naka (Japan), 11-13 Nov 1991). Order Number DE93701251. Source: OSTI; NTIS (US Sales Only); INIS.

The European Programme on Negative Ion Beam development consists presently of three main tasks: (i) the DRAGON experiment starting at Culham, with the objective of accelerating 4 A of D^- to 200 keV; (ii) the conceptual study of a 1 MV, 15 A power supply, conducted in european industry under the supervision of Cadarache; (iii) the design study of a 1MV, 4 A, deuterium test bed at Cadarache, conducted by the EURATOM-CEA Association (Cadarache) with support from the EURATOM-UKAEA association (Culham) and the FOM institute (Amsterdam). The conclusions of these three tasks are to be brought together during the first half of 1992, in order to prepare a proposal for a 1 MV, 4 A, deuterium test bed. Other experimental activities are being conducted in european laboratories, either directly related to the main programme (RF source and plasma neutralizer at Culham; discharge pulsing at Dublin and FOM-Amsterdam) or under separate contracts (energy recovery and cesium seeding at Cadarache).

32443 (CEA-CONF--10947) **Design study of a 1 MV, 4 A, D-test bed in european community.** Pamela, J. (Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee); Hemsworth, R.; Jacquot, C.; Hopman, H.; Holmes, A.J.T. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. 1991. 10p. (CONF-9111260--: I.A.E.A. Technical Committee Meeting on Negative Ion Based Neutral Beam Injector, Naka (Japan), 11-13 Nov 1991). Order Number DE93701253. Source: OSTI; NTIS (US Sales Only); INIS.

The design study of a 1 MV, 4 A, D^-, > 30 seconds, test bed is being conducted by the EURATOM-CEA association (Cadarache) with support from the EURATOM-UKAEA association (Culham) and from FOM-Amsterdam. A proposal for the construction of this test bed at Cadarache will be made by the middle of next year. The options chosen for the beamline are derived from the conceptual design originally proposed one year ago by A. Holmes et al. for the ITER neutral beam systems: pure volume negative ion production, electrostatic multi-stage accelerator, vertically subdivided beamline, electrostatic deflection of the ions at the neutralizer exit, HV vacuum insulation with voltage grading screens. This design has been reviewed in detail and in particular three basic topics have been carefully examined: beam acceleration, gas flow and beam transmission. This review resulted in various changes with respect to the original design, the major change being the decision to put the ion source at high voltage. In parallel to this test bed design study, the conceptual study of a 1 MV, 15 A power supply and of its protection system is conducted by european industrial companies under the supervision of Cadarache.

32444 (CEA-CONF--10948) **First results on D- production in the joint CEA-JAERI experiment at Cadarache.** Pamela, J. (Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee); Fumelli, M.; Jequier, F.; Hanada, M.; Okumura, Y.; Watanabe, K. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. 1991. 9p. (CONF-9111260--: I.A.E.A. Technical Committee Meeting on Negative Ion Based Neutral Beam Injector, Naka (Japan), 11-13 Nov 1991). Order Number DE93701255. Source: OSTI; NTIS (US Sales Only); INIS.

In a joint CEA-JAERI experiment performed at Cadarache. D^- and H^- beams have been studied at 100 keV energies in long pulses. In pure volume production, 0,5 A of D^- and 0.92 A of H^- ions accelerated at 100 keV have been transmitted unto a narrow target (13 cm wide, at 3 m distance). With Cesium seeding in the plasma generator, more than 2 A of D^- have been accelerated at 100 keV of energy and a calorimetric target signal as high as 1.85 A of D^- has been obtained. Cesium seedings allowed also to reduce the operating pressure by a factor 1/5 and extracted electrons by a factor 1/2. These results constitute a significant progress in the development of D^- beams in view of meeting ITER NB requirements. This experiment has also been used to study beam optics in various conditions, which will be useful to further validate negative ion extraction codes. Some features, like edge effects observed in a large aspect ratio accelerator and good results obtained with beamlet merging may constitute valuable informations for conducting the design of the ITER D^- beam accelerator.

32445 (CFFTP-G--9127) **Canadian ceramic breeder sphere-pac technology: Capability and recent results.** Sullivan, J.D. (Atomic Energy of Canada Ltd., Chalk River, ON (Canada). Chalk River Nuclear Labs.); Brayman, C.L.; Verrall, R.A.; Miller, J.M.; Gierszewski, P.J.; Londry, F.; Slavin, A. Canadian Fusion Fuels Technology Project, Toronto, ON (Canada). May 1991. 19p. (CONF-9106310--: 2. international symposium on fusion nuclear technology and exposition, Karlsruhe (Germany), 2-7 Jun 1991). Order Number DE93603008. Source: OSTI; NTIS (US Sales Only); INIS.

Sphere-pac ceramic breeders have been under development in Canada for several years. The goal is to fabricate and characterize these materials for use in engineering test reactors and subsequent fusion power reactors. Practical application of sphere-pac beds requires close consideration of both properties and fabrication. The present emphasis of the program is on 1-3 mm diameter Li_2ZrO_3 spheres, with future development of binary beds planned. Litre quantities have been produced by methods that are applicable to high production rates. These spheres are being tested for measurements of bulk properties (e.g., thermal conductivity, gas permeability, packing density, tritium release, specific heat) and long-term irradiation exposure. This paper summarizes the status of the work.

32446 (CNIC--00464) **The anomalous transport caused by magnetic perturbation in tokamak.** Wang Maoquan (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics). China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 16p. (ASIPP--0021.). Order Number DE93603005. Source: OSTI; NTIS (US Sales Only); INIS.

The distributive probability of magnetic field lines in stochastic field region may be obtained by Liouville equation, by which the statistical average of any physical quantity relating to magnetic field can be given. A method to compute contribution of magnetic perturbations to the anomalous transport is developed. On certain conditions, the momentum equation can be changed into Langevin equation and the fluid element can be regarded as huge molecule in Brownian motion, and then the transfer probability and diffusion coefficient can be obtained by statistical moment. The result indicated that on the same conditions, the anomalous diffusion caused by magnetic perturbation is larger than the classical diffusion and much smaller than Bohm diffusion. At the very high temperature (T > 8 keV) the contribution of magnetic perturbation to anomalous transport is very small.

32447 (CNIC--00480) **Numerical simulation for HT-6M tokamak electrical transient behaviours.** Yu Yuanqi (Academia Sinica, Hefei, AH (China). Inst. of Plasma Physics); Liu Baohua; Pan Yuan. China Nuclear Information Centre, Beijing, BJ (China). Feb 1991. 12p. (ASIPP--0026.). Order Number DE93602996. Source: OSTI; NTIS (US Sales Only); INIS.

The following main points are concerned: (1) State equations used for dynamic analysis of all electrical parameters of the tokamak are derived. (2) In order to increase plasma volt-seconds and to get plasma current with longer sustainment phase, a power supply scheme for HT-6M and its numerical simulation are studied. (3) The distribution of energy flow in coupling loops of the tokamak is discussed, and the energy transfer ratio from the OH loop and vertical field loop to the plasma is also analyzed.

32448 (DOE/ER/53280–6) **Annual performance report for "A program of FRC theory research".** Krall, N.A. Krall Associates, Del Mar, CA (United States). 15 May 1992. 63p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-88ER53280. (KA–92-07). Order Number DE92018557. Source: OSTI; NTIS; INIS; GPO Dep.

The original activities carried out under this Grant were specific to the Fusion scheme known as the Field Reversed Configuration (FRC). With the decisions of the Department of Energy to deemphasize experimental activity in the areas known as "alternate concepts," we have generalized our studies. Since the research we have perfomed on the FRC led us into the area of high beta ($8\pi nT/B^2$) and large orbits, we have chosen to emphasize those areas of plasma physics. The relevance to the mainline fusion program will emerge as our understanding of these areas develops. This statement may not be obvious, but it reflects my observations, developed over the last thirty-two years of fusion research, of how progress is made in this complex field. During the present contract period, we have undertaken three specific studies on large orbit and high β physics which have reached a point of near completion. One of these studies has demonstrated that in large orbit systems collisional relaxation to a Maxwellian distribution proceeds at a surprisingly slow rate, because of the competing effects of collisions which tend to make a local Maxwellian, which in a large orbit system can make remote regions more non-Maxwellian. A second study reopens the problem of confinement of plasma by a cusp magnetic field. Thirdly we note that the separatrix in the FRC can lead the plasma into an x-point on the cyclindrical axis of that devices.

32449 (ECN-C–91-036) **Shielding calculations for NET: NET contract 89-226, first intermediate report.** Verschuur, K.A.; Hogenbirk, A. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1991. 20p. Contract nr. 89-226;ECN Project nr. 1644. Order Number DE93603009. Source: OSTI; NTIS; INIS.

Principal: NET-Team (Next European Torus), Garching, Germany.

In the European Fusion Technology Programme there is only a small activity on research and development for fusion neutronics. Never-the-less, looking further than blanket design now, as ECN is getting involved in design of radiation shields for the coils and biological shields, it becomes apparent that fusion neutronics as a whole still needs substantial development. Existing exact codes for calculation of complex geometries like MCNP and DORT/TORT are put over the limits of their numerical capabilities, whilst approximate codes for complex geometries like FURNACE and MERCURE4 are put over the limits of their modelling capabilities. The main objective of this study is just to find out how far we can get with existing codes in obtaining reliable values for the radiation levels inside and outside the cryostat/shield during operation and after shut-down. Starting with a 1D torus model for preliminary parametric studies, more dimensional approximation of the torus or parts of it including the main heterogeneities should follow. Regular contacts with the NET-Team are kept, to be aware of main changes in NET design that might affect our calculation models. Work on the contract started 1 July 1990. The technical description of the contract is given. (author). 14 refs.; 4 figs.; 1 tab.

32450 (ECN-I–91-032) **Neutron metrology in the HFR: Steel irradiation R139-594/595/596.** Baard, J.H.; Voorbraak, W.P. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jun 1991. 34p. Order Number DE93603013. Source: OSTI; NTIS; INIS.

The experiment R-139-59 for investigating the stainless steel type 316-CL has been irradiated in the HFR Petten. This report presents the metrology results obtained from activation monitors in specimen holders for the steel experiment R139-595/595/596. Data about helium production as well as the number of displacements per atom are also included. The irradiation conditions for this experiment, carried out in a TRIO type capsule in the HFR position H8, are as close as possible to conditions of the EFR (European Fast Reactor) above core structure. Main results of the thermal and fast neutron fluence measurements are presented in table 1 and in figures 1-3. (author). 13 refs.; 3 figs.; 12 tabs.

32451 (ECN-I–91-037) **Neutron metrology in the HFR: Steel irradiation R139-6551.** Appelman, K.H.; Voorbraak, W.P. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jun 1991. 26p. Order Number DE93603015. Source: OSTI; NTIS; INIS.

In this report the metrology results are presented for the thermal and fast neutron measurements with activation monitors in experiment R139-6551, loaded in channel 2 of a TRIO capsule, irradiated in core position D2. The main results of the thermal and fast neutron fluence measurements are presented in table 1 and figures 1. (author). 10 refs.; 1 fig.; 10 tabs.

32452 (ECN-RX–91-067) **Fabrication, properties and tritium release rates of lithium zirconates: Paper presented at the 'Third International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93rd Annual Meeting of the American Ceramic Society', Cincinnati, Ohio, April 28-May 2, 1991.** Kwast, H. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H); Cordfunke, E.H.P.; Muis, R.P. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Aug 1991. 17p. (CONF-9104388–: 3. International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93. Annual Meeting of the American Ceramic Society', Cincinnati OH (United States), 28 Apr - 2 may 1991). Order Number DE93603021. Source: OSTI; NTIS; INIS.

The work described in this paper has been performed in the frame of the European Fusion Technology Programme, tasks B11-B16, with financial support of the Commission of the European Community.

Lithium zirconates are potential tritium breeding materials for fusion reactor blankets. Although Li_2ZrO_3 has been considered as the prime ceramic breeder material in the EXOTIC experiments 4 and 5, $Li_6Zr_2O_7$ and Li_8ZrO_6 have been irradiated also. The samples of $Li_6Zr_2O_7$ and Li_8ZrO_6 for EXOTIC-4 were all made by NRL-Springfields (UK), the $Li_6Zr_2O_7$ samples for EXOTIC-5 also, and those of Li_8ZrO_6 by ECN-Petten. Recently, ECN also made $Li_6Zr_2O_7$, to be irradiated in EXOTIC-6. In this paper the fabrication and properties of $Li_6Zr_2O_7$ and Li_8ZrO_6 will be discussed, and some of the material characteristics will be given, including tritium residence times obtained from temperature transients carried out during irradiation. (author). 16 refs.; 5 figs.; 2 tabs.

32453 (ECN-RX–91-102) **Short status report on EFF and EAF projects: Presented at the Topical Conference on Nuclear Data for Fusion Reactor Technology, NEANDC Meeting, Karlsruhe, October 22, 1991.** Gruppelaar, H. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)). Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Oct 1991. 6p. (CONF-9110231–: Topical conference on nuclear data for fusion reactor technology, Karlsruhe (Germany), 23 Oct 1991). Order Number DE93603022. Source: OSTI; NTIS; INIS.

A short status report is given on the European Fusion File (EFF) and European Activation File (EAF) projects. The EFF-2 data file is nearly finished and processing and benchmarking is underway. There is also a second version (EAF-2) of the activation file which is a very extensive and complete data base. Recently follow-up programmes have been defined for the introduction of EFF-2 to the user community after benchmarking and for further improvement of the quality of the two data files. There is extensive international cooperation, which is becoming increasingly important to solve remaining difficult problems. (author). 17 refs.

32454 (ECN-RX–92-013) **Structural analyses of ITER toroidal field coils under fault conditions.** Jong, C.T.J. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)).

Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Apr 1992. 25p. (CONF-9206272--: ANSYS Technology Conference and Exhibition, Pittsburgh PA (United States), 8-12 Jun 1992). Order Number DE93603006. Source: OSTI; NTIS; INIS.

This paper will be presented at the ANSYS Technology Conference and Exhibition, June 8-12, 1992, Pittsburgh, Pennsylvania, USA.

ITER (International Thermonuclear Experimental Reactor) is intended to be an experimental thermonuclear tokamak reactor testing the basic physics performance and technologies essential to future fusion reactors. The magnet system of ITER consists essentially of 4 sub-systems, i.e. toroidal field coils (TFCs), poloidal field coils (PFCs), power supplies, and cryogenic supplies. These subsystems do not contain significant radioactivity inventories, but the large energy inventory is a potential accident initiator. The aim of the structural analyses is to prevent accidents from propagating into vacuum vessel, tritium system and cooling system, which all contain significant amounts of radioactivity. As part of design process 3 conditions are defined for PF and TF coils, at which mechanical behaviour has to be analyzed in some detail, viz: normal operating conditions, upset conditions and fault conditions. This paper describes the work carried out by ECN to create a detailed finite element model of 16 TFCs as well as results of some fault condition analyses made with the model. Due to fault conditions, either electrical or mechanical, magnetic loading of TFCs becomes abnormal and further mechanical failure of parts of the overall structure might occur (e.g. failure of coil, gravitational supports, intercoil structure). The analyses performed consist of linear elastic stress analyses and electro-magneto-structural analyses (coupled field analyses). 8 refs.; 5 figs.; 5 tabs.

32455 (EGG-FSP-10262) **Investigation of component failure rates for pulsed versus steady state tokamak operation.** Cadwallader, L.C. EG and G Idaho, Inc., Idaho Falls, ID (United States). Jul 1992. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019758. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents component failure rate data sources applicable to magnetic fusion systems, and defines multiplicative factors to adjust these data for specific use on magnetic fusion experiment designs. The multipliers address both long pulse and steady state tokamak operation. Thermal fatigue and radiation damage are among the leading reasons for large multiplier values in pulsed operation applications. Field failure rate values for graphite protective tiles are presented, and beryllium tile failure rates in laboratory testing are also given. All of these data can be used for reliability studies, safety analyses, design tradeoff studies, and risk assessments.

32456 (EGG-FSP-10347) **Verification and validation of TMAP4.** Longhurst, G.R.; Harms, S.L.; Marwil, E.S.; Miller, B.G. EG and G Idaho, Inc., Idaho Falls, ID (United States). 8 Jul 1992. 94p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE92019684. Source: OSTI; NTIS; INIS; GPO Dep.

The Tritium Migration Analysis Program MOD/CY04 (TMAP4) was written to be used in analyzing experiments and for safety calculations that involve the injection, solution, diffusion, trapping, release, and other related processes experienced by hydrogen isotopes in materials. Because of the desire to make it suitable for analyzing safety issues, it is important that TMAP4 be certified (verified and validated) at Quality Assurance Level A. This report documents the work done to achieve that certification. The process includes assuring that the developed code meets the software requirements specified in the Software Quality Assurance Plan, verifying that the code functions in accordance with the written description and that it is self-consistent and internally correct, and validating that its computed results are in agreement with experimental data and/or known analytical solutions. Quality Level A certification for TMAP4 is specifically for implementation on an IBM PS/2 Model 70 operating under DOS 5.0. Certification for any other environment will require demonstration that all of the verification and validation tests documented here give the same results in the new environment.

32457 (EGG-M-91508) **A vacuum disengager for tritium removal from HYLIFE-II Reactor Flibe.** Dolan, T.J. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Longhurst, G.R.; Garcia-Otero, E. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-920607-18: 10. topical meeting on technology of fusion energy, Boston, MA (United States), 7-12 Jun 1992). Order Number DE92017886. Source: OSTI; NTIS; INIS; GPO Dep.

We have designed a vacuum disengager system to remove tritium from the Flibe (Li_2BeF_4) molten salt coolant of the HYLIFE-II fusion reactor. There is a two-stage vacuum disengager in each of three intermediate heat exchanger (IHX) loops. Each stage consists of a vacuum chamber 4 m in diameter and 7 m tall. As 0.2 mm diameter molten salt droplets fall vertically downward into the vacuum, most of the tritium diffuses out of the droplets and is pumped away. A fraction $\Phi \sim 10^{-5}$ of the 8.6 MCi/day tritium source (from breeding in the Flibe and from unburned fuel) remains in the Flibe as it leaves the vacuum disengagers, and about 21% of that permeates into the intermediate coolant loop, so about 20 Ci/day leak into the steam system. With Flibe primary coolant and a vacuum disengager, it appears that an intermediate coolant loop is not needed to prevent tritium from leaking into the steam system. An experiment is needed to demonstrate Flibe vacuum disengager operation.

32458 (EUR-CEA-FC-1446) **Determination of the safety factor profile in Tore Supra from striations observed during pellet ablation.** Dubois, M.A.; Sabot, R.; Pegourie, B.; Drawin, H.W.; Geraud, A. Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee. Jan 1992. 17p. Source: OSTI; NTIS (US Sales Only); INIS.

Striations in H_α (D_α) light observed across the ablation cloud of injected hydrogen pellets can be explained in most cases by the presence of resonant magnetic surfaces. We show that it is possible to identify them and to obtain a very detailed profile of the safety factor. This q- profile shows shear plateaus related to rational q-values, thus suggesting the presence of magnetic turbulence.

32459 (GA-A-20914) **Future development of the DIII-D tokamak program.** Simonen, T.C. General Atomics, San Diego, CA (United States). Jul 1992. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-89ER51114 ;W-7405-ENG-48 ;AC03-89ER52153 ;AC05-84OR21400. (CONF-9204146-4: Fusion Power Associates annual meeting and symposium, Pleasanton, CA (United States), 9 Apr 1992). Order Number DE92040051. Source: OSTI; NTIS; INIS; GPO Dep.

The DIII-D long range research program focuses on diverter and advanced tokamak issues. Our DIII-D goal is to provide an integrated demonstration of well-confined high-beta diverter plasma with non-inductive current drive. Our reference scenario is 5% beta with 2MA for 10s. Implementation of this plan will resolve many ITER R&D issues, validate many aspects of the ITER engineering design, possibly open new ITER operating options, and identify engineering design concepts for an attractive DEMO to follow the success of ITER. The DIII-D plan for implementation of new research tools is discussed in this paper. To implement this program will require additional research tools, in particular a radiative divertor configuration and higher power rf systems for non-inductive current profile control.

32460 (JAERI-M-92-041) **Japanese contribution of ITER PF systems design during CDA.** Azumi, Masafumi (Japan Atomic Energy Research Inst., Naka, Ibaraki (Japan). Naka Fusion Research Establishment); Hasegawa, Mitsuru; Kameari, Akihisa. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 108p. Order Number DE93703493. Source: OSTI; NTIS; INIS.

This report presents the brief summary of major part of Japanese contributions to the poloidal field coil systems design during conceptual design activity (CDA). The followings are studied; layout of poloidal field coil system, effects of plasma triangularity and current profile, alternative configurations such as semi-double null and single null divertor plasmas apart from the reference double null plasma, magnetic line tracing study for the detailed examination of the divertor plasmas, repulsive force on the center solenoid for the volt-second saving operation scenario, general criteria of vertical stability by passive structure, stability performance of two types of passive structure, saddle loop type and twin loop type, in-vessel coil current and voltage evaluation required for active control of plasma verrical position, TOLFEX method for the identification of plasma shape and position for the control of ITER plasma, control of horizontal plasma position during breakdown, slow control algorithm for the plasma shape, means to reduce the effective divertor peak heat load, separatrix sweeping both by SC coils and in-vessel coils, feasibility to generate the ergodic magnetic layer by in-vessel coils for the vertical position control, simulation of plasma dynamic behavior after the thermal quench by TSC code. Many of the results are not fully complete, while should be sufficient o demonstrate the feasibility of the CDA design. (J.P.N.).

32461 (JAERI-M--92-045) **Design of JAERI Gyrotron Test Facility.** Tsuneoka, Masaki (Japan Atomic Energy Research Inst., Naka, Ibaraki (Japan). Naka Fusion Research Establishment); Fujita, Hideo; Nagashima, Takashi. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. 100p. (In Japanese). Order Number DE93703496. Source: OSTI; NTIS; INIS.

This report describes the design of a high power Radio Frequency Test Facility at JAERI, Naka. A high power Klystron Test Facility is modified into the high power Radio Frequency Test Facility that is also able to operate a high power gyrotron in the range of 100 GHz for Electron Cyclotron Resonance Heating (ECRH) system. (author).

32462 (JAERI-M--92-053) **Comparison of double-differential neutron emission cross sections calculated from evaluated nuclear data libraries with experimental data.** Fukahori, Tokio; Chiba, Satoshi; Asami, Tetsuo. Japan Atomic Energy Research Inst., Tokyo (Japan). ©Apr 1992. 212p. Sponsored by Japan Atomic Energy Research Inst., Tokyo (Japan). (INDC(JPN)--159/L). Order Number DE92015167. Source: OSTI; NTIS (US Sales Only).

The energy-angle double differential cross sections of emitted neutrons (DDXs) from neutron induced reactions are fundamental data for fusion neutronics calculation. The third version of Japanese Evaluated Nuclear Data Library (JENDL-3) was produced aiming at the applications related to the fission neutronics as well as fusion reactors. In order to check the reliability of the evaluated data, the DDX data for 32 elements from lithium to uranium calculated from JENDL-3 were compared with experimental data and values calculated from other two major evaluated nuclear data libraries, ENDF/B-VI and JEF-2. The comparison was made at the neutron incident energies of 4.2, 5.4, 6.0, 14.1 and 18.0 MeV, and at the angles of 30°, 60°, 90°, 120° and 150°. It was found that the DDX data calculated from JENDL-3 could reproduce overall trend of experimentally observed values. However, some discrepancies were also recognized.

32463 (JAERI-M--92-056) **Comparison between a steady-state fusion reactor and an inductively driven pulse reactor.** Murakami, Yoshiki (Japan Atomic Energy Research Inst., Naka, Ibaraki (Japan). Naka Fusion Research Establishment); Horiike, Hiroshi; Kuroda, Toshimasa; Matsuzaki, Yoshimi; Shimomura, Yasuo; Sugihara, Masayoshi. Japan Atomic Energy Research Inst., Tokyo (Japan). Apr 1992. 61p. Order Number DE93703545. Source: OSTI; NTIS; INIS.

Characteristics of an inductively driven pulse reactor are reviewed and compared with those of a steady-state reactor. Operation regions of both types of the reactor are studied for various toroidal fields. Sample parameters of the pulse reactor are presented and the pulse duration time is calculated for various cases on the basis of the ITER technology. The thermal instability of the pulse reactor is examined by using the reference energy confinement scaling laws for ITER. The pulse reactor could be a future fusion reactor if the plasma is stably maintained with no or very small additional heating power. Reactor size, however, is relatively large and the enormous additional equipments are required. In the steady-state reactor, the requirement in the confinement, βlimit and the divertor performance are relatively strict, while the reactor size is more compact and the controllability of the plasma is better than the pulse reactor. (J.P.N.).

32464 (LA-UR--92-2582) **Applications of group-invariant analytic solutions to inertial confinement fusion.** Coggeshall, S.V. Los Alamos National Lab., NM (United States). [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-920913--11: 14. international conference on plasma physics and controlled nuclear fusion research, Wuerzburg (Germany), 30 Sep - 7 oct 1992). Order Number DE92040347. Source: OSTI; NTIS; INIS; GPO Dep.

Analytic solutions to 1-,2-, and 3-D hydrodynamics are presented which can be applied to specific aspects of Inertial Confinement Fusion target evolutions. These solutions include drive source time profiles for 1-D isentropic implosions, 2-D P_2 asymmetric compressions, 1- and 2-D solutions for the stagnation phase of implosions, and a 3-D spinning (mixing) solution.

32465 (NIKHEF-H--92-04) **BRST field theory of relativistic particles.** Holten, J.W. van (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H). Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H. 1992. 18p. Order Number DE93602998. Source: OSTI; NTIS; INIS.

Research supported by the Stichting F.O.M.

A generalization of BRST field theory is presented, based on wave operators for the fields constructed out of, but different from the BRST operator. The authors discuss their quantization, gauge fixing and the derivation of propagators. It is shown, that the generalized theories are relevant to relativistic particle theories in the Brink-Di Vecchia-Howe-Polyakov (BDHP) formulation, and argue that the same phenomenon holds in string theories. In particular it is shown, that the naive BRST formulation of the BDHP theory leads to trivial quantum field theories with vanishing correlation functions. (author). 22 refs.

32466 (PNL-SA--19945) **Isotopic tailoring with ^{59}Ni to study the effect of helium on microstructural evolution and mechanical properties of neutron-irradiated Fe-Cr-Ni alloys.** Garner, F.A. (Pacific Northwest Lab., Richland, WA (United States)); Hamilton, M.L.; Greenwood, L.R.; Stubbins, J.F.; Oliver, B.M. Pacific Northwest Lab., Richland, WA (United States). Mar 1992. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920673--10: 16. annual symposium of American Society of Testing and Materials (ASTM), Denver, CO (United States), 21-22 Jun 1992). Order Number DE92019372. Source: OSTI; NTIS; INIS; GPO Dep.

Tensile testing on three model Fe-Cr-Ni alloys removed from four discharges of the $_{59}$Ni isotopic doping experiment in FFTF-MOTA indicates that helium/dpa ratios typical of fusion reactors do not produce changes in the yield strength or elongation that are significantly different from those at much lower helium generation rates. It also appears that tensile properties approach a saturation level that is dependent only on the final irradiation temperature, but not prior temperature history or thermomechanical starting condition. The saturation in mechanical properties reflects a similar saturation in microstructure that is independent of starting condition. The successful conduct of an isotopic doping experiment was found to require post-irradiation measurement of the helium levels in order to compensate for uncertainties in the cross sections for burn-out and burn-in of $_{59}$Ni and for uncertainties in neutron flux and spectra in the vicinity of the edge of the core.

32467 (PNL-SA--19956) **The response of dispersion-strengthened copper alloys to high fluence neutron irradiation at 415°C.** Edwards, D.J. (Missouri Univ., Rolla, MO (United States)); Newkirk, J.W.; Garner, F.A.; Hamilton, M.L.; Nadkarny, A.; Samal, P. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920673--9: 16. annual symposium of American Society of Testing and Materials (ASTM), Denver, CO (United States), 21-22 Jun 1992). Order Number DE92019434. Source: OSTI; NTIS; INIS; GPO Dep.

Various oxide-dispersion-strengthened copper alloys have been irradiated to 150 dpa at 415°C in the Fast Flux Test Facility (FFTF). The $Al_2 0_3$ - strengthened GlidCop™ alloys, followed closely by a HfO_2 - strengthened alloy, displayed the best swelling resistance, electrical conductivity, and tensile properties. The conductivity of the HfO_2 - strengthened alloy reached a plateau at the higher levels of irradiation, instead of exhibiting the steady decrease in conductivity observed in the other alloys. A high initial oxygen content resulted in significantly higher swelling for a series of castable oxide-dispersion-strengthened alloys, while a Cr_20_3 -strengthened alloy showed poor resistance to radiation.

32468 (PPPL-CFP-2621) **Magnetic fusion and project ITER.** Park, H.K. Princeton Univ., NJ (United States). Plasma Physics Lab. [1992]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. (CONF-9207127-1: Summer symposium on science, Seoul (Korea, Republic of), 6-10 Jul 1992). Order Number DE92018447. Source: OSTI; NTIS; INIS; GPO Dep.

It has already been demonstrated that our economics and international relationship are impacted by an energy crisis. For the continuing prosperity of the human race, a new and viable energy source must be developed within the next century. It is evident that the cost will be high and will require a long term commitment to achieve this goal due to a high degree of technological and scientific knowledge. Energy from the controlled nuclear fusion is a safe, competitive, and environmentally attractive but has not yet been completely conquered. Magnetic fusion is one of the most difficult technological challenges. In modem magnetic fusion devices, temperatures that are significantly higher than the temperatures of the sun have been achieved routinely and the successful generation of tens of million watts as a result of scientific break-even is expected from the deuterium and tritium experiment within the next few years. For the practical future fusion reactor, we need to develop reactor relevant materials and technologies. The international project called "International Thermonuclear Experimental Reactor (ITER)" will fulfill this need and the success of this project will provide the most attractive long-term energy source for mankind.

32469 (SAND-91-0284) **Report on the joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups.** Nygren, R.E. (ed.). Sandia National Labs., Albuquerque, NM (United States). Apr 1992. 434p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9009508-: Joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups, Albuquerque, NM (United States), 12-14 Sep 1990). Order Number DE92019097. Source: OSTI; NTIS; INIS; GPO Dep.

The Plasma/Wall Interaction and High Heat Flux Materials and Components Task Groups typically hold a joint meeting each year to provide a forum for discussion of technical issues of current interest as well as an opportunity for program reviews by the Department of Energy (DOE). At the meeting in September 1990, reported here, research programs in support of the International Thermonuclear Experimental Reactor (ITER) were highlighted. The first part of the meeting was devoted to research and development (R&D) for ITER on plasma facing components plus introductory presentations on some current projects and design studies. The balance of the meeting was devoted to program reviews, which included presentations by most of the participants in the Small Business Innovative Research (SBIR) Programs with activities related to plasma wall interactions. The Task Groups on Plasma/Wall Interaction and on High Heat Flux Materials and Components were chartered as continuing working groups by the Division of Development and Technology in DOE's Magnetic Fusion Program. This report is an addition to the series of "blue cover" reports on the Joint Meetings of the Plasma/Wall Interaction and High Heat Flux Materials and Components Task Groups. Among several preceding meetings were those in October 1989 and January 1988.

32470 (SAND-92-0370C) **Low energy helium implantation in evaporated nickel surfaces.** Nygren, R.E. (Sandia National Labs., Albuquerque, NM (United States)); Doyle, B.L.; Walsh, D.S.; Ottenberger, W.; Brooks, J.N.; Krauss, A. Sandia National Labs., Albuquerque, NM (United States). [1992]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-920311-23: 10. international conference on plasma-surface interactions in controlled fusion devices, Monterey, CA (United States), 30 Mar - 3 apr 1992). Order Number DE92019297. Source: OSTI; NTIS; INIS; GPO Dep.

This paper reports data on helium (He) implantation at low energy (100–200eV) in nickel (Ni) that support a concept for He self-pumping in tokamaks, and specifically an experiment in TEXTOR. These data indicate trapping saturates at about 4×10^{19} He/m^2 areal density for He implanted at 100 eV He in Ni at 500°C. Neither prior implantation of deuterium (D) nor D bombardment of Ni surfaces already containing implanted He significantly changed the He saturation value. A model for trapping capacity and these data were used to predict He self pumping in TEXTOR.

32471 (UCID-21816) **HYLIFE-2 progress report.** Moir, R.W. (Lawrence Livermore National Lab., CA (United States)); Adamson, M.G.; Bangerter, R.O.; Bieri, R.L.; Condit, R.H.; Hartman, C.W.; House, P.A.; Langdon, A.B.; Logan, B.G.; Orth, C.D.; Petzoldt, R.W.; Pitts, J.H.; Post, R.F.; Sacks, R.A.; Tobin, MLawrence Livermore National Lab., CA (United States). Dec 1991. 283p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92040947. Source: OSTI; NTIS; INIS; GPO Dep.

LIFE-II inertial confinement fusion power plant design study uses a liquid fall, in the form of jets to protect the first structural wall from neutron damage, x rays, and blast to provide a 30-y lifetime. This is a progress report of an incomplete and ongoing study. HYLIFE-I used liquid lithium. HYLIFE-11 avoids the fire hazard of lithium by using a molten salt composed of fluorine, lithium, and beryllium (Li_2Be_4) called Flibe. Access for heavy-ion beams is provided. Calculations for assumed heavy-ion beam performance show a nominal gain of 70 at 5 MJ producing 350 MJ, about 5.2 times less yield than the 1.8 GJ from a driver energy of 4.5 MJ with gain of 400 for HYLIFE-I. The nominal 1 GWe of power can be maintained by increasing the repetition rate by a factor of about 5.2, from 1.5 to 8 Hz. A higher repetition rate requires faster reestablishment of the jets after a shot, which can be accomplished in part by decreasing the jet fall height and increasing the jet flow velocity. Multiple chambers may be required.In addition, although not considered for HYLIFE-I there is undoubtedly liquid splash that must be forcibly cleared because gravity is too slow, especially at high repetition rates. Splash removal can be accomplished by either pulsed or oscillating jet flows. The cost of electricity is estimated to be 0.10 \$/kW· in constant 1990 dollars, about twice that of future coal and light water reactor nuclear power. The driver beam cost is about one-half the total cost.

32472 (UCRL-ID-107986) **Inertial confinement fusion driver enhancements: Final focusing systems and compact heavy-ion driver designs.** Bieri, R.L. Lawrence Livermore National Lab., CA (United States). 17 Jul 1991. 169p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019906. Source: OSTI; NTIS; INIS; GPO Dep.

Required elements of an inertial confinement fusion power plant are modeled and discussed. A detailed analysis of two critical elements of candidate drivers is done, and new component designs are proposed to increase the credibility and feasibility of each driver system. An analysis of neutron damage to the final elements of a laser focusing system is presented, and multilayer – dielectric mirrors are shown to have damage lifetimes which axe too short to be useful in a commercial power plant. A new final-focusing system using grazing incidence metal mirrors to protect sensitive laser optics is designed and shown to be effective in extending the lifetime of the final focusing system. The reflectivities and damage limits of grazing incidence metal mirrors are examined in detail, and the required mirror sizes are shown to be compatible with the beam sizes and illumination geometries currently envisioned for laser drivers. A detailed design and analysis is also done for compact arrays of superconducting magnetic quadrupoles, which are needed in a multi-beam heavy-ion driver. The new array model is developed in more detail than some previous conceptual designs and models arrays which are more compact than arrays scaled from existing single – quadrupole designs. The improved integrated model for compact arrays is used to compare the effects of various quadrupole array design choices on the size and cost of a heavy-ion driver. Array design choices which significantly affect the cost of a heavy-ion driver include the choice of superconducting material and the thickness of the collar used to support the winding stresses. The effect of these array design choices on driver size and cost is examined and the array model is used to estimate driver cost savings and performance improvements attainable with aggressive quadrupole array designs with high-performance superconductors.

32473 (UCRL-JC–103286) **LANSA: A large neutron scintillator array for neutron spectroscopy at Nova.** Nelson, M.B.; Cable, M.D.; Bennett, C.K.; Mant, G. Lawrence Livermore National Lab., CA (United States). 11 May 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920362–41: 9. topical conference on high-temperature plasma diagnostics, Santa Fe, NM (United States), 15-19 Mar 1992). Order Number DE92019539. Source: OSTI; NTIS; INIS; GPO Dep.

A very sensitive neutron time-of-flight spectrometer is now in use at Nova. LANSA consists of 960 channels of a neutron sensitive liquid scintillator (10 x IO x IO cm) coupled to a photomultiplier tube followed by a discriminator, TDC and ADC to allow the measurement of neutron arrival time as well as pulse size. LANSA is capable of measuring yields as low as 2.3 x 10^5 DT neutrons (100 detected hits) with resolution of 2.3 ns (170 key for 14 MeV neutrons with 20 m flight path). Shielding and collimation provide background levels low enough to allow measurement of secondary and tertiary reaction neutrons. Details of design, testing, calibration and experimental results will be presented. This work was performed under the auspices of the US Department of Energy by Lawrence Livermore National Laboratory under contract No. W-7405-ENG-48.

32474 (UCRL-JC–108860) **A design for an advanced divertor for DIII-D and ITER: The radiative slot divertor.** Allen, S.L. (Lawrence Livermore National Lab., CA (United States)); Rensink, M.E.; Hill, D.N.; Wood, R.; Nilson, D.; Logan, B.G.; Stambaugh, R.; Petrie, T.W.; Staebler, G.M.; Mahdavi, M.A.; Hulse, R.; Campbell, R.B. Lawrence Livermore National Lab., CA (United States). Mar 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48 ;AC03-89ER51114 ;AC04-76DP00789. (CONF-920311–24: 10. international conference on plasma-surface interactions in controlled fusion devices, Monterey, CA (United States), 30 Mar - 3 apr 1992). Order Number DE92019579. Source: OSTI; NTIS; INIS; GPO Dep.

Reduction of the divertor heat load is an important issue for future tokamaks, particularly during the technology phase of ITER. We discuss a conceptual design for one type of advanced divertor: the radiative slot divertor. The goal of this divertor configuration is to enhance the radiation in the divertor region and thereby reduce the heat load at the strike points. At the same time, any effects on the core plasma must be minimized. Proof-of-principle experiments to enhance the radiation in the DIII-D divertor have been performed both with deuterium and impurity injection. We compare several computer models with results from these experiments to predict performance and thereby guide designs of radiative divertors for future machines. We have estimated impurity radiation using calculations of the background plasma with the 2-dimensional code B2 coupled with non-coronal models of impurity radiation. The DEGAS code has been used to estimate hydrogenic transport, charge exchange, and radiation losses. Estimates of impurity transport are provided by 1-1/2 dimensional models and calculations of impurity frictional-force terms. These model results are in qualitative agreement with the ~1MW reduction of measured divertor power in DIII-D during divertor impurity puffing experiments. Specific designs, including engineering details, for applications to DIII-D and ITER will be discussed.

32475 (UCRL-JC–108861) **DIII-D edge physics database.** Jong, R.A. (Lawrence Livermore National Lab., CA (United States)); Porter, G.D.; Hill, D.N.; Buchenauer, D.A.; Bramson, G. Lawrence Livermore National Lab., CA (United States). Mar 1992. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48 ;AC04-76DP00789 ;AC03-89ER51114. (CONF-920311–25: 10. international conference on plasma-surface interactions in controlled fusion devices, Monterey, CA (United States), 30 Mar - 3 apr 1992). Order Number DE92019577. Source: OSTI; NTIS; INIS; GPO Dep.

We have developed an edge-physics database containing data for the plasma in the divertor region and the scrape-off layer (SOL) for the DIII-D tokamak. The database provides many of the parameters necessary to model the power flow to the divertor and other plasma processes in the plasma edge. It will also facilitate the analysis of DIII-D data for comparison with other divertor tokamaks. In addition to the core plasma parameters, edge-specific data are included in this database. Initial results using the database show good agreement between the pressure profiles measured by the Langmuir probes and those determined from the Thomson data for the inner strike point, but not for the outer strike point region. We also find that the ratio of separatrix density to average core density, as well as the in/out asymmetry in the SOL power at the divertor in DIII-D do not agree with values currently assumed in modeling the International Thermonuclear Experimental Reactor (ITER).

32476 (UCRL-JC–109256) **Preparation, optical and laser properties of Nd-doped sol-gel silica.** Thomas, I.M.; Payne, S.A.; Wilke, G.D. Lawrence Livermore National Lab., CA (United States). 1 Jul 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920792–25: SPIE international symposium on optical applied science and engineering, San Diego, CA (United States), 19-24 Jul 1992). Order Number DE92019378. Source: OSTI; NTIS; GPO Dep.

A novel sol-gel process has been used to prepare homogeneous, fully dense, cylindrical samples of neodymium-doped silica and neodymium- aluminum-doped silica. The absorption and emission spectra, fluorescent lifetimes and quantum yields of all samples were measured. The quantum yields of Nd_2O_3-SiO_2 samples wee very low due to clustering of the Nd in the silica matrix. The incorporation of alumina eliminated the clustering and quantum yields up to 55% were obtained. We showed that these quantum yields of less than unity were caused by residual OH quenching of the Nd fluorescence. The fluorescent properties were unchanged when the OH was replaced with OD. One sample was demonstrated to lase under laser pumping.

32477 (UCRL-JC–109555) **High bandwidth second-harmonic generation in partially deuterated KDP.** Webb, M.S.; Eimerl, D.; Velsko, S.P. Lawrence Livermore National Lab., CA (United States). 30 Jan 1992. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920124–26: Society of Photo-Optical Instrumentation Engineers' international symposium on laser spectroscopy as part of SPIE's symposium on optics, electro-optics and laser applications in science and engineering, Los Angeles, CA (United States), 1 Order Number DE92019505. Source: OSTI; NTIS; INIS; GPO Dep.

We have experimentally determined the spectrally noncritical phasematching behavior of Type I frequency doubling in KDP and its dependence on deuteration level in partially deuterated KDP. The first order wavelength sensitivity parameter$\delta \Delta k / \delta \gamma$ for Type I doubling of 1.053 μm light vanishes for a KD*P crystal with a deuteration level between 10 and 14%. Very high bandwidth frequency doubling of Nd:glass lasers is possible with such a crystal.

32478 (UCRL-JC–110036) **Recent Nova experimental results.** Kilkenny, J.D.; Baldis, H.A.; Batha, S.H.; Cable, M.D.; Campbell, E.M.; Cook, R.C.; Darrow, C.B.; Dittrich, T.; Ellis, R.J.; Glendinning, S.G.; Haan, S.W.; Hammel, B.A.; Hatchett, S.P.; Kania, D.R.; Kauffman, R.L.; Kornblum, H.N.; Landen, O.L.; Lane, S.M.;Lawrence Livermore National Lab., CA (United States). 16 Mar 1992. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-920607–19: 10. topical meeting on technology of fusion energy, Boston, MA (United States), 7-12 Jun 1992). Order Number DE92019783. Source: OSTI; NTIS; INIS; GPO Dep.

The Inertial Confinement Fusion (ICF) Program and the Lawrence Livermore National Laboratory has made substantial progress in understanding the details of the radiation drive and the dynamics of capsules imploded by the Nova laser. A detailed understanding, validated by Nova experiments of the crucial physics for implosions is necessary before a new facility is started. A National Academy of Science Review Committee on ICF has recently endorsed a 12 point technical contract for the Nova program. Recent experiments have achieved a substantial number of these goals. A decrease in the level of plasma instabilities has been demonstrated by the use of phase plates. Neutron measurements have been used to demonstrate high densities in well understood implosions. A detailed understanding of the Rayleigh-Taylor instability at the ablation front of x-ray driven planar foil targets with large hydrodynamic growth factors has been proven. X-ray spectroscopy has been used to demonstrate a high fuel density and an improvement in the compression ratio of targets when a shaped pulse is used to keep a pusher on a low rho-r trajectory.

32479 (UCRL-JC-110478) **Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991.** Faris, G.W. (SRI International, Menlo Park, CA (United States). Molecular Physics Lab.); Hickman, A.P. Lawrence Livermore National Lab., CA (United States); SRI International, Menlo Park, CA (United States). Feb 1992. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE92019549. Source: OSTI; NTIS; INIS; GPO Dep.

The basic physics and material properties needed to describe and predict the Brillouin gain for a variety of materials have been investigated. Lawrence Livermore National Laboratory (LLNL) has identified transverse stimulated Brillouin scattering (SBS) as an important limiting mechanism in high power laser fusion systems. At sufficiently high laser intensities, SBS drives acoustic vibrations that can damage optical components. SRI has performed measurements and developed the corresponding theory for stimulated Brillouin gain spectroscopy in anisotropic crystals. Absolute Brillouin steady-state gain coefficients, linewidths, and frequency shifts have been determined at 532 nm for a number of optical materials of interest to LLNL. This knowledge can be used to select optical materials and devise suppression schemes that will allow much higher laser fluences to be used in laser fusion.

99 GENERAL AND MISCELLANEOUS

32480 (DOE/ER-0558T) **Advanced energy projects FY 1992 research summaries.** USDOE Office of Energy Research, Washington, DC (United States). Advanced Energy Projects Div. Sep 1992. 61p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92040442. Source: OSTI; NTIS; INIS; GPO Dep.

The Division of Advanced Energy Projects (AEP) provides support to explore the feasibility of novel, energy-related concepts that evolve from advances in basic research. These concepts are typically at an early stage of scientific definition and, therefore, are beyond the scope of ongoing applied research or technology development programs. The Division provides a mechanism for converting basic research findings to applications that eventually could impact the Nation's energy economy. Technical topics include physical, chemical, materials, engineering, and biotechnologies. Projects can involve interdisciplinary approaches to solve energy-related problems. Projects are supported for a finite period of time, which is typically three years. Annual funding levels for projects are usually about $300,000 but can vary from approximately $50,000 to $500,000. It is expected that, following AEP support, each concept will be sufficiently developed and promising to attract further funding from other sources in order to realize its full potential. There were 39 research projects in the Division of Advanced Energy Projects during Fiscal Year 1992 (October 1, 1991 – September 30, 1992). The abstracts of those projects are provided to introduce the overall program in Advanced Energy Projects. Further information on a specific project may be obtained by contacting the principal investigator, who is listed below the project title. Projects completed during FY 1992 are indicated.

32481 (DOE/ER/75603-1) **The Teachers Academy for Mathematics and Science: Executive summary and program activities update.** Teachers Academy for Mathematics and Science, Chicago, IL (United States). [1992]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER75603. Order Number DE92019141. Source: OSTI; NTIS; GPO Dep.

In his State of the Union address on January 31, 1990, President Bush set a goal for US students to be number one in the world in mathematics and science achievement by the year 2000. The Teachers Academy for Mathematics and Science in Chicago is an experiment of unprecedented boldness and scale that can provide a means to the President's goal, both for the Chicago area and as a national model. This document covers organization and governance, program activities, future training goals, and evaluation programs.

32482 (DOE/ER/75657-1) **Progress performance report of clean uses of fossil fuels.** Kentucky Univ., Lexington, KY (United States). Research Foundation. [1992]. 74p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER75657. Order Number DE92019456. Source: OSTI; NTIS; GPO Dep.

A one-year USDOE/EPSCOR Traineeship Grant, entitled "Clean Uses of Fossil Fuels." was awarded to the Kentucky EPSCoR Committee in September 1991 and administered through the the DOE/EPSCoR Subcommittee. Ten Traineeships were awarded to doctoral students who are enrolled or accepted into Graduate Programs at either the University of Kentucky or the University of Louisville. The disciplines of these students include Biology, Chemical Engineering, Chemistry, Geological Sciences, and Physics. The methods used for a statewide proposal solicitation and to award the Traineeships are presented. The review panel and Kentucky DOE/EPSCoR Subcommittee involved in awarding the Traineeships are described. A summary of the proposed research to be performed within these awards is presented, along with a description of the qualifications of the faculty and students who proposed projects. Future efforts to increase participation in Traineeship proposals for the succeeding funding period are outlined.

32483 (KFK-5046) **KfK Laboratory for Isotope Technology. Progress report on research and development activities in 1991.** Kernforschungszentrum Karlsruhe GmbH (Germany). Lab. fuer Isotopentechnik. Mar 1992. 15p. (In German). Order Number DE93702252. Source: OSTI; NTIS (US Sales Only); INIS.

The R and D work done by the Laboratory for Isotope Technology (LIT) in 1991 under the project of pollutant control in the environment, concentrated on thermal waste treatment processes, avove all on the classical refuse incineration, for which closed-circuit pollutant balances were established, and process engineering studies were made aimed at reducing pollutants in waste gas. The central research facility of the LIT is the semi-technical pilot plant TAMARA (test plant for refuse incineration, waste gas purification, residue recycling, waste water treatment) with a throughout of 200 kg/hour of refuse. It was put into operation in 1986. The annex lists the publications by the LIT staff. (orig.).

32484 (LA-UR-92-2158) **The challenge of performance-based MC&A training for R&D facilities.** Lopez, R.L.; Price, R.L. Los Alamos National Lab., NM (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9207102-24: Institute of Nuclear Materials Management (INMM) annual meeting, Orlando, FL (United States), 19-22 Jul 1992). Order Number DE92018896. Source: OSTI; NTIS; INIS; GPO Dep.

The US Department of Energy (DOE) is requiring its contractors to conduct business in accordance with "Formality of Operations". Formality of operations has been extended into areas previously exempt; specifically, training. Formal training, qualification and certification standards have existed for many years within the military and commercial nuclear industry, but are relatively new to DOE contractors. These standards are especially challenging to national laboratories engaged in research and development (R&D). Formal training programs within this R&D environment present significant challenges due to the mission, culture, and employee profiles of these institutions. This paper addresses the design, development and implementation of a formal Los Alamos National Laboratory (LANL) Nuclear Materials Control & Accountability (MC&A) Training Program in response to draft DOE Order 5630.XX. "Safeguards and Security Training Program". Major issues covered include: (1) Performance-based training in the research community, (2) implementation challenges of DOE 5630.XX, (3) a working model using a graded approach, and (4) lessons teamed. The LANL MC&A Training Program is a performance-based training program modified to fit the R&D mission of the Laboratory.

32485 (SAND-91-2391C) **The problem with security: Public perception versus reality.** Caskey, D.L. Sandia National Labs., Albuquerque, NM (United States). [1991]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9210111-6: International Carnahan conference on security technology, Atlanta, GA (United States), 14-16 Oct 1992). Order Number DE92019455. Source: OSTI; NTIS; GPO Dep.

The public perception of "security", both of the requirements and the implementation, is often at odds with the judgment of security professionals. There is clearly a need to bridge the existing gulf, both by better education of the public, and by the security community gaining a better understanding of public policy, its constraints and limitations, and the effects of public perception. This paper explores the topic through the examination of a case study. The example chosen was the recent Gulf War's effects on airport security in the US. The paper provides an analysis of the threat, as perceived by the FAA and the airports, the security measures imposed by the FAA, and their effects, on both public perception and in fact, from a technical security view. It also suggests that the lack of vulnerability analysis is a major problem in providing effective security.

9901 Management

Refer also to citation(s) 31000, 31017, 31051, 31057, 32204, 32520

32486 (DOE/AD-0029) **DOE Real Property: A yearly statistical handbook: Fiscal year 1992.** USDOE Assistant Secretary for Management and Administration, Washington, DC (United States). Office of Project and Facilities Management. [1992]. 87p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019907. Source: OSTI; NTIS; GPO Dep.

This handbook is prepared a a service to Department officials and others who have a need to reference real property data as part of their day-to-day functions. Information is arranged from broad Department levels through more narrow site level tables. Sections are arranged first by land holdings, followed by buildings, and lastly, by other structures and facilities. Other structures and facilities are real property components such as exterior utilities, roads, parking lots, exterior lighting, storage tanks, railroads tracks, and other similar items. The information is limited to real and related personal property holdings. Data on equipment holdings is available from other Department sources.

32487 (DOE/AD-0033P) **Work for others at the US Department of Energy: Summary report.** USDOE Office of Administration and Human Resource Management, Washington, DC (United States). Aug 1992. 44p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92040441. Source: OSTI; NTIS; GPO Dep.

The Department of Energy (DOE) Work for Others (WFO) Program has been a successful means of providing highly specialized scientific and technical services and products to non-DOE entities. Through its Management and Operating (M&O) contractors, DOE provides opportunities for solving critical and challenging advanced research and technology problems to other Federal agencies, State and local governments and private industry, which otherwise would be unattainable in the private sector. DOE also benefits by enhancing its technological base and capabilities and providing for the possibility of applying advances to DOE work. These activities result in increasing research and development interactions between DOE facilities and industry to facilitate transfer of technology for further development or commercialization. The WFO Annual Report provides a characterization of this work using selected examples of projects, financial information and identification of DOE management improvement efforts undertaken to strengthen management and oversight of WFO.

32488 (DOE/EH-0254) **Line Program Environmental Management Audit: Formerly Utilized Sites Remedial Action Program.** USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). Office of Environmental Audit. May 1992. 178p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019100. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents the results of the Line Program Environmental Management Audit completed for the Formerly Utilized Sites Remedial Action Program (FUSRAP). During this Audit, activities and records were reviewed and personnel interviewed at Oak Ridge, Tennessee. Additionally, since FUSRAP falls under the responsibility of the Office of the Assistant Secretary for Environmental Restoration and Waste Management, selected individuals from this office were interviewed in Washington, DC and Germantown, Maryland. The onsite portion of the FUSRAP Audit was conducted from March 16 through 27, 1992, by the US Department of Energy's Office of Environmental Audit (EH-24) located within the Office of the Assistant Secretary for Environment, Safety and Health (EH-1). The scope of the FUSRAP Line Program Environmental Management Audit was comprehensive and included all areas of environmental management with the exception of the National Environmental Policy Act (NEPA). Since the subject of compliance with and implementation of the requirements of NEPA is the responsibility of the DOE Headquarters Office of NEPA Oversight, management issues pertaining to NEPA were not investigated as part of this Audit.

32489 (DOE/PR-0023) **DOE Personal Property Management Factbook, Fiscal Year 1991.** USDOE Office of Procurement, Assistance and Program Management, Washington, DC (United States). [1991]. 71p. Sponsored by USDOE, Washington, DC (United States). Order Number DE92019101. Source: OSTI; NTIS; GPO Dep.

Contains many tables and charts.

The 1991 edition of the Personal Property Management Factbook reflects the Property and Equipment Management Division's (PR-162) efforts in providing accurate data and oversight concerning the Department of Energy's (DOE) personal property assets. Currently DOE holds approximately $11.7 billion in personal property which is located at Management and Operating contractors' installations, Offsite contractors' facilities, and DOE field activities throughout the country. The data presented within this text has been compiled from annual and semiannual personal property reports submitted through the Financial Information System and from the above mentioned organizations. The areas covered are: Surplus Property Transactions including Reutilization, Donation and Sale; Equipment Held For Future Projects; Stores Management; Motor Vehicle Management; and Aircraft Management. This Factbook is intended as a source of information concerning the scope of DOE's personal property activities and property management trends across the Department.

32490 (EGG-M-92340) **OJT...make 'em or break 'em.** Arner, S.A. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9205237-1: 1992 Mid-Atlantic nuclear training managers instructor workshop, Harrisburg, PA (United States), 4-6 May 1992). Order Number DE92017852. Source: OSTI; NTIS; GPO Dep.

On-the-job training (OJT) has been with us in varying forms for longer than perhaps any other type of training. In reality, OJT is a process for accomplishing change; change in an employee's ability to perform assigned job duties. However, bringing about that change can often be a difficult process. A clear understanding of what change really is and what it entails is essential to easing its process. this document discusses the methodology in OJT and emphasizes the importance of communications in this process.

32491 (INIS-mf-14060) **Program budget 1992 of the Karlsruhe Nuclear Research Center. As of November 19, 1991.** Kernforschungszentrum Karlsruhe GmbH (Germany). 1992 28p. (In German). Order Number DE93702170. Source: OSTI; NTIS (US Sales Only); INIS.

In the future, the research program of the Nuclear Research Center in Karlsruhe will concentrate on three areas, which are of the same status over the medium term: Environmental research, energy research and micro system technology and fundamental research. The central infrastructure, the financial planning and the assignment of research and development projects of the Nuclear Research Center are presented in tables. (orig./HP).

32492 (KEK-PR–91-2) **Photon Factory activity report, 1991.** National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan). 1992. 522p. Order Number DE93704262. Source: OSTI; NTIS; INIS.

The Photon Factory is a national synchrotron radiation research facility affiliated with the National Laboratory for High Energy Physics located in Tsukuba Science City. The Photon Factory consists of a 2.5 GeV electron/positron linear accelerator, a 2.5 GeV electron/positron storage ring, beam lines and experimental stations. All the facilities for synchrotron radiation research are open to scientists. A part of the accumulation ring of the TRISTAN main ring has been used as a synchrotron radiation source in the energy range from 5.8 to 6.5 GeV. The Photon Factory is composed of three divisions of Injector Linac, Light Source and Instrumentation. The researches of each divisions are reviewed, and the users' short reports are collected. The list of published papers with author index is also included in the publication. (K.I.) 233 refs.

32493 (NEI-NO–250) **Institutt for Energiteknikk - Annual report 1991.** Institutt for Energiteknikk, Kjeller (Norway). 1992 26p. Order Number DE93602472. Source: OSTI; NTIS; INIS.

Work at Institutt for Energiteknikk (IFE) comprises both nuclear and non-nuclear activities. The Halden Reactor Project focuses on two main areas: fuel- and materials technology based on experimental work using the Halden reactor; and information technology with emphasis on the development of computer-based systems for controlling and surveilling complex energy plants and industrial processes. The Halden Project represents a collaboration between national safety organizations, national research institutes, power companies and supply industries in 13 OECD countries. Participation by such Eastern European countries as Czechoslovakia is being discussed in concrete terms. At Kjeller irradiation services are based on the JEEP II reactor and the gamma irradiation facility. Neutron irradiation in the reactor produces the radioactive raw materials for the manufacture of radiopharmaceuticals and radiochemicals. Neutron irradiation is also used for the accurate control of conductivity in superpure silicon crystals. The main purpose of IFE's basic research in physics is to utilize neutron beams from the JEEP II reactor for fundamental studies of the physical characteristics of solids and complex liquids. 16 figs.

32494 (NEI-SE–95) **What role can nuclear power play in mitigating global warming?.** Pasztor, J. (Stockholm Environment Institute, Boston Center (United States)). Stockholm Environment Inst. (Sweden). Dec 1989. 32p. Order Number DE92644662. Source: OSTI; NTIS; INIS.

The purpose of this paper is to look at nuclear fission, as one of the available options, and evaluate qualitatively the extent to which it can play a role in greenhouse gas reduction strategies during the next three decades. No attempt will be made here to make a quantitative comparison with alternative energy supplies, or with energy efficiency measures.

32495 (NIRS-AR–34) **Annual report of National Institute of Radiological Sciences of the fiscal year 1990.** National Inst. of Radiological Sciences, Chiba (Japan). Jan 1992. 266p. (In Japanese). Order Number DE93704237. Source: OSTI; NTIS; INIS.

This annual report presents the activities of the National Institute of Radiological Sciences in Japan in the fiscal year 1990. The activities are divided into research, technical aids, training, medical services, management affairs at the Nakaminato Laboratory Branch Office, library or editing, international cooperation, and general affairs. Research activities are described under the following sections: (1) special researches covering 'biological risk evaluation in public exposure' and 'exposure assessment in the environment and the public involved in food chain', 'medical use of accelerated heavy ions', and 'survey for the demonstration of dose-response relationships in low dose irradiation'; (2) five assigned researches; (3) ordinary researches concerning physics, pharmacochemistry, biology, genetics, pathology and physiology, cell biology, internal exposure, envionmental science, clinical research, clinical research for radiation injuries, medical use of heavy particles, environmental radiation ecology, and aquatic radiation ecology; (4) risk estimation of radiation; (5) survey for radiation response phenomena in fish and in immunity associated with low dose irradiation; (6) actual surveys for Bikini victims, population doses of medical and occupational exposure, and thorotrast exposure; (7) project research; (8) integrated atomic energy-based technological research; (9) radioactivity survey; (10) research supported by Science and Technology Agency aids; (11) International research cooperation; (12) government-private joint cooperative study. Appendices include the personnel list and the bibliography of articles reported by the staff. (N.K.) 870 refs.

32496 (OUP–92-09) **Section for nuclear physics and energy physics - Annual Report: January 1 - December 31, 1991.** Oslo Univ. (Norway). Fysisk Inst. Apr 1992. 102p. Order Number DE92644663. Source: OSTI; NTIS; INIS.

This annual report summarizes the research and development activities of the Section for Nuclear Physics and Energy Physics at the University of Oslo in 1991. It includes experimental and theoretical nuclear physics, as well as other fields of physics in which members of the section have participated. The report describes completed projects and work currently in progress. As in previous years, the experimental activities in nuclear physics have mainly been centered around the Cyclotron Laboratory with the SCANDITRONIX MC-35 Cyclotron. Using the CACTUS multidetector system, several experiments have been completed. Some results have been published while more data remains to be analyzed.

32497 (PNL-SA–20410) **Integrated risk management for business survival.** Piatt, J.A. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9206181–4: Risk Management conference, Boston, MA (United States), 7-11 Jun 1992). Order Number DE92019433. Source: OSTI; NTIS; INIS; GPO Dep.

During the recent recession, many businesses have had to take severe measures to cut costs. The Department of Defense has also been faced with the need to cut costs to offset the expense of the Gulf War and a shrinking budget due to the fall of communism around the world. With the collapse of the Warsaw Pact and dissolution of the Soviet Union, there has been an increasing demand to reduce the defense budget to provide the so-called "peace dividend" to deal with social and economic problems at home. President Bush's State of the Union Message in February 1992 called for deeper cuts than the 25% previously anticipated. It also called for these cuts to occur sooner than expected with $50 billion in defense cuts anticipated over the fiscal 1992–1997 period. The Department of Defense plan for force resizing calls for 25-30% reductions over time. This report discusses how the department of defense is trying to deal with the management of this crisis.

32498 (RISO-R–607) **Materials Department. Annual report 1991.** Horsewell, A.; Hansen, N. (eds.). Risoe National Lab., Roskilde (Denmark). Materials Dept. Mar 1992. 64p. Order Number DE92644664. Source: OSTI; NTIS; INIS.

Selected activities of the Materials Department at Risoe National Laboratory during 1991 are described. The work is presented in three chapters: Materials Science, Materials Engineering and Materials Technology. A survey is given of the Department's participation in international collaboration and of its activities within education and training. Furthermore, the main figures outlining the funding and expenditure of the Department are given. Lists of staff members, visiting scientists, publications, lectures and poster presentations are included. (au).

32499 (RISO-R–611) **Optics and Fluid Dynamics Department. Annual progress report 1 January - 31 December 1991.** Juul Rasmussen, J.; Hanson, S.G. (eds.). Risoe National Lab., Roskilde (Denmark). Optics and Fluid Dynamics Dept. Mar 1992. 56p. Order Number DE92644665. Source: OSTI; NTIS; INIS.

Research in the Optics and Fluid Dynamics Department covers quasi-elastic light scattering, optical and electronic information processing, continuum physics and activities in connection with the Euratom fusion association. A summary of activities in 1991 is presented. Optical diagnostic methods based on quasielastic light scattering have been developed. Beam propagation in random and nonlinear media has been investigated. Spatial and temporal processing schemes, especially for pattern recognition, have been investigated. Within the area of fluid dynamics spectral models for studying the dynamics of coherent structures have been developed. Coherent structures have been investigated in a plasma and are now also investigated in a rotating fluid. Fusion relevant work performed under the Euratom association includes investigations of turbulent transport and the development of diagnostic methods. A special activity is concentrated on the development of pellet injection systems for fusion research. (au) (1 tab., 20 ills., 37 refs.).

32500 (RISO-R-625) **Nuclear Safety Research Department. Annual progress report 1991.** Majborn, B.; Brodersen, K.; Hoejerup, C.F.; Heikel Vinther, F. (eds.). Risoe National Lab., Roskilde (Denmark). Nuclear Safety Research Dept. Mar 1992. 23p. Order Number DE92644666. Source: OSTI; NTIS; INIS.

The report describes the work of the Nuclear Safety Research Department during 1991. The activities cover health physics, reactor physics, operation of the educational reactor DR 1, and waste management. Lists of staff and publications are included together with a summary of participation in international working groups etc. (au) (5 ills., 59 refs.).

32501 (WSRC-MS-92-249) **Statistical process management: An essential element of quality improvement.** Buckner, M.R. Westinghouse Savannah River Co., Aiken, SC (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-9208123-1: 1992 Westinghouse electronic systems group statistics symposium, Baltimore, MD (United States), 7 Aug 1992). Order Number DE92019934. Source: OSTI; NTIS; GPO Dep.

Successful quality improvement requires a balanced program involving the three elements that control quality: organization, people and technology. The focus of the SPC/SPM User's Group is to advance the technology component of Total Quality by networking within the Group and by providing an outreach within Westinghouse to foster the appropriate use of statistic techniques to achieve Total Quality. SPM encompasses the disciplines by which a process is measured against its intrinsic design capability, in the face of measurement noise and other obscuring variability. SPM tools facilitate decisions about the process that generated the data. SPM deals typically with manufacturing processes, but with some flexibility of definition and technique it accommodates many administrative processes as well. The techniques of SPM are those of Statistical Process Control, Statistical Quality Control, Measurement Control, and Experimental Design. In addition, techniques such as job and task analysis, and concurrent engineering are important elements of systematic planning and analysis that are needed early in the design process to ensure success. The SPC/SPM User's Group is endeavoring to achieve its objectives by sharing successes that have occurred within the member's own Westinghouse department as well as within other US and foreign industry. In addition, failures are reviewed to establish lessons learned in order to improve future applications. In broader terms, the Group is interested in making SPM the accepted way of doing business within Westinghouse.

9902 Mathematics and Computers

Refer also to citation(s) 30441, 30442, 30443, 30444, 30445, 30446, 30601, 30669, 30717, 30720, 30722, 30756, 30759, 30769, 30873, 30894, 30910, 30911, 30916, 30926, 30936, 30937, 30940, 30941, 30946, 30957, 30961, 31021, 31024, 31026, 31030, 31031, 31076, 31117, 31119, 31125, 31231, 31236, 31241, 31277, 31285, 31304, 31345, 31346, 31394, 31452, 31527, 31582, 31583, 31616, 31623, 31624, 31626, 31649, 31673, 31697, 31698, 31727, 31728, 32062, 32065, 32073, 32145, 32217, 32269, 32271, 32348, 32349, 32350, 32352, 32363, 32365, 32405, 32475, 32501

32502 (ANL/CP-76324) **Memory access in shared virtual memory.** Berrendorf, R. (Zentralinstitut fuer Angewandte Mathematik Forschungszentrum Juelich, KFA (FRG)). Argonne National Lab., IL (United States). [1992]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209180-1: CONPAR 92: international conference on parallel processing, Lyon (France), 1-4 Sep 1992). Order Number DE92019594. Source: OSTI; NTIS; GPO Dep.

Shared virtual memory (SVM) is a virtual memory layer with a single address space on top of a distributed real memory on parallel computers. We examine the behavior and performance of SVM running a parallel program with medium-grained, loop-level parallelism on top of it. A simulator for the underlying parallel architecture can be used to examine the behavior of SVM more deeply. The influence of several parameters, such as the number of processors, page size, cold or warm start, and restricted page replication, is studied.

32503 (ANL/CP-76726) **The efficient parallel iterative solution of large sparse linear systems.** Jones, M.T.; Plassmann, P.E. Argonne National Lab., IL (United States). Jun 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9110404-1: IMA workshop on sparse matrix computations: graph theory issues and algorithms, Minneapolis, MN (United States), 14-18 Oct 1991). Order Number DE92018769. Source: OSTI; NTIS; GPO Dep.

The development of efficient, general-purpose software for the iterative solution of sparse linear systems on a parallel MIMD computer requires an interesting combination of expertise. Parallel graph heuristics, convergence analysis, and basic linear algebra implementation issues must all be considered. In this paper, we discuss how we have incorporated recent results in these areas into a general-purpose iterative solver. First, we consider two recently developed parallel graph coloring heuristics. We show how the method proposed by Luby, based on determining maximal independent sets, can be modified to run in an asynchronous manner and give aa expected running time bound for this modified heuristic. In addition, a number of graph reduction heuristics are described that are used in our implementation to improve the individual processor performance. The effect of these various graph reductions on the solution of sparse triangular systems is categorized. Finally, we discuss the performance of this solver from the perspective of two large-scale applications: a piezoelectric crystal finite-element modeling problem, and a nonlinear optimization problem to determine the minimum energy configuration of a three-dimensional, layered superconductor model.

32504 (ANL/MCS-P-69-0389) **LAPACK Working Note 9: A test matrix generation suite.** Demmel, J. (New York Univ., NY (United States). Courant Institute); McKenney, A. Argonne National Lab., IL (United States). 28 Feb 1989. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92019334. Source: OSTI; NTIS; GPO Dep.

We discuss the design and implementation of a suite of test matrix generators for testing linear algebra software. These routines generate random matrices with certain properties which are useful for testing linear equation solving, least squares, and eigendecomposition software. These properites include the spectrum, symmetry, bandwidth, norm, sparsity, conditioning (with respect to inversion or for the eigenproblem), type (real or complex), and storage scheme (dense, packed or banded).

32505 (ANL/TM-413-Rev.1) **Guide to computer protection at ANL: Revision 1.** Doty, M.W. (ed.); Troyer, L.J. Argonne National Lab., IL (United States). Jun 1992. 123p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE92040419. Source: OSTI; NTIS; GPO Dep.

This report discusses the following topics: ANL computer Protection; The ANL Computer Protection Program; and ANL Computer Protection Program Responsibilities.

32506 (CNIC-00342) **The development of computer codes for NPP fuel behavior analysis at IAE.** Zhang Yingchao (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Zhang Chongzhu; Fu Guogan; Zhu Yimin; Zhang Zhongyue. China Nuclear Information Centre, Beijing, BJ (China). Oct 1989. 6p. (In Chinese). (IAE-0067.). Order Number DE93602457. Source: OSTI; NTIS (US Sales Only); INIS.

Several computer codes, PYCH-W, RYCH-T and CRAP etc. used for fuel behavior analysis of nuclear power plant (NPP) have been developed at IAE (Institute of Atomic Energy). The main results calculated by these codes agree well with that obtained by widely used foreign codes. Besides, several foreign codes, FRAPCON-2, FRAP-T6, POSHO-THERMAL, FAMREC etc. have been introduced and transplanted on CYBER-825 computer. These codes have been used or will soon be used to analyze fuel behavior for Qinshan NPP which is under construction in China. For safety analysis, FRAPCON-2, FRAP-T6 and system thermal-hydraulics codes such as RELAP4/MOD7 and RELAP5/MOD1 have been linked with each other. In practical use some problems have been found. It is desirable that some codes are to be improved further.

32507 (CNIC–00403) **The development and improvement of a fault tree program.** Zhao Xishun (Beijing Inst. of Nuclear Engineering, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China). May 1990. 10p. (In Chinese). (BINE–0011.). Order Number DE93602458. Source: OSTI; NTIS (US Sales Only); INIS.

The transplanting and improvement of a fault tree program are introduced. The main improvements are adding the calculation importance of interrelated cut-sets, cutting the number of cut-set when its value is greater than the given value, the failure probability of a minimum cut-set, queuing of the interrelated cut-sets and recutting function when the failure probability of a cut-set is less than the threshold. The calculated results show that it can give the same results and the computing time can be greatly saved by using this improved program.

32508 (CNIC–00460) **Numerical research of multiple integral.** Mou Zongze (Southwest Inst. of Physics, Leshan, SC (China)); Zhao Huaiguo; Peng Congrong. China Nuclear Information Centre, Beijing, BJ (China). Dec 1990. 14p. (In Chinese). (SIP–0044.). Order Number DE93602460. Source: OSTI; NTIS (US Sales Only); INIS.

The methods, algorithms and computer codes presently available for numerical calculation of multiple integrals are reviewed. In order to cope with strong singular integrand, a numerical method is proposed, which seems very attractive to avoid numerical divergence. Seven subroutines for numerical calculation of multiple integrals are set up on personal computer IBM XT. Discussion and comparison are made by a great number of computing examples with the subroutines. Specification of the codes is given.

32509 (CONF-9105126–7) **Computer assisted audit techniques for UNIX (UNIX-CAATS).** Polk, W.T. National Inst. of Standards and Technology, Gaithersburg, MD (United States). [1991]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI01-83IG00049. From 14. U.S. Department of Energy (DOE) computer security group conference; Concord, CA (United States); 7-9 May 1991. Order Number DE92019011. Source: OSTI; NTIS; GPO Dep.

Federal and DOE regulations impose specific requirements for internal controls of computer systems. These controls include adequate separation of duties and sufficient controls for access of system and data. The DOE Inspector General's Office has the responsibility to examine internal controls, as well as efficient use of computer system resources. As a result, DOE supported NIST development of computer assisted audit techniques to examine BSD UNIX computers (UNIX-CAATS). These systems were selected due to the increasing number of UNIX workstations in use within DOE. This paper describes the design and development of these techniques, as well as the results of testing at NIST and the first audit at a DOE site. UNIX-CAATS consists of tools which examine security of passwords, file systems, and network access. In addition, a tool was developed to examine efficiency of disk utilization. Test results at NIST indicated inadequate password management, as well as weak network resource controls. File system security was considered adequate. Audit results at a DOE site indicated weak password management and inefficient disk utilization. During the audit, we also found improvements to UNIX-CAATS were needed when applied to large systems. NIST plans to enhance the techniques developed for DOE/IG in future work. This future work would leverage currently available tools, along with needed enhancements. These enhancements would enable DOE/IG to audit large systems, such as supercomputers.

32510 (CONF-9205214–) **DATA: How to generate, store, retrieve, communicate, and interpret it: Proceedings.** Carlson, R.E. (ed.). Lawrence Livermore National Lab., CA (United States). Jul 1992. 245p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. From High speed computing conference; Glenenden Beach, OR (United States); 11-14 May 1992. Order Number DE92040405. Source: OSTI; NTIS; GPO Dep.

This report contains viewgraphs covering the following topics: Considerations for the evolution of high speed networking; gigabit networks; status of LLNL's prototype gigabit/sec Lan; distributed data server infrastructure for seismic processing on a new spectrum of computing platforms, sequoia 2000: computer science applied to global change research; toward transparent, distributed storage systems; Lanl's high-performance data system; the data millieu for climate modeling at the national center for atmospheric research; the pass project: database computing for the SSC; a comparison of three application dependent mass storage systems; striped arrays of tertiary storage devices; abstracts: a technique for hiding latency in a mass-storage system; marching cubes on the CM-2; A carpetbagger's guide to the human genome project; global change research, large data sets and landsat pathfinder; organizing and interpreting data in a modeling and simulation environment; high- resolution adaptive methods for compressible flow; future computers - an intellectual power grid and; high speed computing in the '90's: the technologies and the delivery.

32511 (CONF-9206152–1) **Driving a car with custom-designed fuzzy inferencing VLSI chips and boards.** Pin, F.G.; Watanabe, Y. Oak Ridge National Lab., TN (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (CESAR–92/11A). From International joint technology workshop on fuzzy logic and neural networks; Houston, TX (United States); 1-3 Jun 1992. Source: OSTI; NTIS; GPO; OSTI; NTIS; GPO Dep.

Short communication. AUTOMOBILES/computerized control systems; COMPUTERIZED CONTROL SYSTEMS/fuzzy logic; AUTOMOBILES; INTEGRATED CIRCUITS; ARTIFICIAL INTELLIGENCE; NAVIGATION; NEURAL NETWORKS

32512 (CONF-9209109–2) **Speedup properties of phases in the execution profile of distributed parallel programs.** Carlson, B.M. (Oak Ridge National Lab., TN (United States)); Wagner, T.D.; Dowdy, L.W.; Worley, P.H. Oak Ridge National Lab., TN (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 6. international conference on modelling techniques and tools for performance evaluation; Edinburgh (United Kingdom); 16-18 Sep 1992. Order Number DE92019965. Source: OSTI; NTIS; GPO Dep.

The execution profile of a distributed-memory parallel program specifies the number of busy processors as a function of time. Periods of homogeneous processor utilization are manifested in many execution profiles. These periods can usually be correlated with the algorithms implemented in the underlying parallel code. Three families of methods for smoothing execution profile data are presented. These approaches simplify the problem of detecting end points of periods of homogeneous utilization. These periods, called phases, are then examined in isolation, and their speedup characteristics axe explored. A specific workload executed on an Intel iPSC/860 is used for validation of the techniques described.

32513 (CONF-9210136–2) **Identifying and building an expert system: The programmer's role.** Crutcher, J.W. Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States). [1992]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From American Society of Information Science (ASIS) annual meeting; Pittsburgh, PA (United States); 26-29 Oct 1992. Order Number DE92018740. Source: OSTI; NTIS; GPO Dep.

A customer wants a computer program or perhaps "some training." Would the customer's needs be better met by an expert system? If the needs analysis reveals some of the following problems, the answer may be yes. Bottle neck situations that can be resolved with "expert" information. Recurring problems that can be solved with flow chart logic. Tedious, hard-to-decipher processes or mathematical equations that are repetitious and prone to human error. Processes that require drawing information from huge databases. Confusing, sometimes seemingly conflicting information that may be documented in tomes of regulations and procedures. What do these problems have in common? Information. More specifically, information that is difficult to access and/or understand-information that most likely resides with one or more human experts.

32514 (CONF-9210148–1) **ScaLAPACK: A scalable linear algebra library for distributed memory concurrent computers.** Choi, Jaeyoung (Oak Ridge National Lab., TN (United States)); Walker, D.W.; Dongarra, J.J.; Pozo, R. Oak Ridge National Lab., TN (United States). [1992]. 9p. Sponsored by USDOE, Washington, DC (United States); Department of Defense, Washington, DC (United States). DOE Contract AC05-84OR21400. Contract DAAL03-91-C-0047. From 4. symposium on frontiers of massively parallel computing; McLean, VA (United States); 19-21 Oct 1992. Order Number DE92017823. Source: OSTI; NTIS; GPO Dep.

This paper describes ScaLAPACK, a distributed memory version of the LAPACK software package for dense and banded matrix computations. Key resign features are the use of distributed versions of the Level 3 BLAS as building blocks, and an object-based interface to the library routines. The square block scattered decomposition is described. The implementation of a distributed memory version of the right-looking LU factorization algorithm on the Intel Delta multicomputer is discussed, and performance results are presented that demonstrate the scalability of the algorithm.

32515 (DOE/ER/61215–1) **[Studies of ocean predictability at decade to century time scales using a global ocean general circulation model in a parallel competing environment]: Progress report.** California Univ., San Diego, La Jolla, CA (United States). 10 Mar 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-91ER61215. Order Number DE92019457. Source: OSTI; NTIS; GPO Dep.

The first phase of the proposed work is largely completed on schedule. Scientists at the San Diego Supercomputer Center (SDSC) succeeded in putting a version of the Hamburg isopycnal coordinate ocean model (OPYC) onto the INTEL parallel computer. Due to the slow run speeds of the OPYC on the parallel machine, another ocean is being model used during the first part of phase 2. The model chosen is the Large Scale Geostrophic (LSG) model form the Max Planck Institute.

32516 (ECN-I–92-015) **A shortcoming of NITAWL/BONAMI causing problems in KENO calculations.** Kruijf, W.J.M. de (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Li Jianmang. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). May 1992. 18p. Order Number DE93602462. Source: OSTI; NTIS; INIS.

A serious error may occur in Monte Carlo calculations with the code KENO-Va if self-shielding of the fissile isotopes is important and if the quantity ν-σ_f is given under MT=1452 on the AMPX-W data file. It appears that this product has not been corrected for the self-shielding, which should have been done in the BONAMI and the NITAWL modules. Other complications may arise if first- and higher-chance fission cross-sections are given separately on the AMPX-M data file. The subroutine CRRCT of the NITAWL module and the subroutines FUDGE and FODGE of the BONAMI module have been improved to overcome these problems. (author). 5 refs.; 1 fig.; 3 tabs.

32517 (ECN-RX–91-063) **Simplified modeling and code usage in the PASC-3 code system by the introduction of a programming environment: Contribution to 'International Conference on Nuclear Criticality Safety-INC'91', Oxford, UK, 9-13 September 1991.** Pijlgroms, B.J. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Oppe, J.; Oudshoorn, H.L.; Slobben, J. Netherlands Energy Research Foundation (ECN), Petten (Netherlands). Jun 1991. 12p. (CONF-910993–: International conference on nuclear criticality (ICNC) safety, Oxford (United Kingdom), 9-13 Sep 1991). Order Number DE93602463. Source: OSTI; NTIS; INIS.

A brief description is given of the PASC-3 (Petten-AMPX-SCALE) Reactor Physics code system and associated UNIPASC work environment. The PASC-3 code system is used for criticality and reactor calculations and consists of a selection from the Oak Ridge National Laboratory AMPX-SCALE-3 code collection complemented with a number of additional codes and nuclear data bases. The original codes have been adapted to run under the UNIX operating system. The recommended nuclear data base is a complete 219 group cross section library derived from JEF-1 of which some benchmark results are presented. By the addition of the UNIPASC work environment the usage of the code system is greatly simplified. Complex chains of programs can easily be coupled together to form a single job. In addition, the model parameters can be represented by variables instead of literal values which enhances the readability and may improve the integrity of the code inputs. (author). 8 refs.; 6 figs.; 1 tab.

32518 (EGG-M–91471) **"You need this done by when?": Increasing your efficiency with the SAS® system.** DeHaan, M.S. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-920426–3: 17. annual atomic spectroscopy safeguards and security (SAS) users group international symposium, Honolulu, HI (United States), 12 Apr 1992). Order Number DE92017894. Source: OSTI; NTIS; GPO Dep.

The SAS institute publication – SAS Programming Tips: A Guide to Efficient SAS Processing defines efficiency as "obtaining more results from fewer computer or human resources." While this publication contains many very useful tips, it seems to concentrate mostly on computer efficiency. This paper will focus on ways of increasing your efficiency in developing, writing, and debugging SAS programs, i.e. increasing human efficiency. In my job as a consulting statistician, my programs are usually one-run programs. That is, I develop and test a program, then I run them once to get the results I need, and the program is typically never used again. Even for multiple run jobs, the greatest expense by far is the time used to develop a program, and any CPU/hardware "expense" is relatively insignificant. I believe that this is true for most SAS system users and that not enough attention has been given to this aspect of "cost". While most of these tips and techniques were developed under the PC platform, nearly all are applicable and useful under all SAS supported platforms. Some of the tips the experienced SAS programmer may already be familiar with, but many should be new and useful to both novice and veteran users.

32519 (ESTSC–000171IPCAT01) **ADASAGE40: Ada application development system.** Taylor, M. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Russell, K.; Stewart, H. EG and G Idaho, Inc., Idaho Falls, ID (United States). 1 May 1992. Sponsored by USDOE, Washington, DC (United States); Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research; Department of Defense, Washington, DC (United States). Source: ESTSC.

Description: IBM PC/AT; MS-DOS 3.1; Alsys ADA 4.33 (92%) and Assembler (8%); 10 3.50 Diskettes. The Alsys Ada 4.33 compiler is required. Earlier releases of ADA (i.e., 4.2,4.23, etc.) are incompatible with ADASAGE4.0. The ADASAGE reference documents are written in ARC format and, when extracted, must be printed with WORDPERFECT.

ADASAGE4.0 is an application development system designed to facilitate rapid and professional construction of applications written in Ada on microcomputers. Applications may vary in size from small to large multiprogram systems. ADASAGE4.0 consists of a collection of re-usable libraries for database management and form and report processing utilities having the following capabilities: basic universal type and function definitions; sequential file input/output; terminal and file input/output; DOS system command execution; data movement and fill; string manipulation; math libraries; bit manipulation; a relational database utility; data validation; menu form and window procedures; report generation; sort/merge, time, and date functions; sound production; editing; and index rebuilding. These capabilities are integrated to allow the development of an efficient system. As an application is designed and developed, ADASAGE capabilities are selected and included along with any requirements unique to that application.

32520 (ESTSC–000190IBMPC01) **PMAS4.0: Performance Measurement Analysis System.** Stoeckle, K. (USDOE Office of Project and Facilities Management, (United States)). USDOE, Washington, DC (United States). 1 May 1990. Sponsored by USDOE, Washington, DC (United States). (NESC–9671). Source: ESTSC.

Description: IBM PC; PC DOS; dBASE III; 1 5.25 Diskette.

The PMAS4.0 (Performance Measurement Analysis System) is a user-oriented system designed to track the cost and schedule performance of Department of Energy (DOE) major projects (MPs) and major system acquisitions (MSAs) reporting under DOE Order 5700.4A, Project Management System. PMAS4.0 provides for the analysis of performance measurement data produced from management control systems complying with the Federal Government's Cost and Schedule Control Systems Criteria.

32521 (ESTSC–000208GE63500) **GENED ENV ROUTINES: Subroutine library.** Wassem, F.A. (General Electric Company, San Jose, CA (United States)). General Electric Co., Sunnyvale, CA (United States). Advanced Reactor Systems Dept. 17 Nov 1971. Sponsored by USDOE, Washington, DC (United States). (NESC–515). Source: ESTSC.

Description: GE635; GECOS; FORTRAN IV and GMAP; 1 Mag Tape.

The GENED ENVIRONMENTAL ROUTINES consists of a set of standard routines written at the General Electric Nuclear Energy Division and a set of standard GE635 system routines. A partial list of routines includes the following; BITA moves bits from one word to another without altering those bits outside the range of the call. CASE positions an input file so that the input data following a case card can be read. DRAW is a general-purpose plotting routine used to (a) draw a grid network, (b) label the grid network, (c) draw curves within the grid network, (d) allow two different y-axis values, and (e) produce a bar or histogram plot. FLTBCD converts a FORTRAN floating-point number to a BCD number in either F or E format. HELP is used to supply a user with the type of device (tape/disk/drum) and the number of links used if the device is a disk or drum unit. ISERVE is a function with various options to pick up and/or convert one of the following - date, clock time, case number, user identification, and computer processor time. ISUP permits the user to suppress a fixed-point number or binary configuration when printing or punching with FORTRAN I/O. LISTFORM consists of two subprograms, JGEGEN and JGEOUT, and enables the FORTRAN user to write output tapes (for printing or punching) in a more efficient and faster manner than is possible with a FORTRAN WRITE (I,N) LIST statement, which must scan the FORMAT statement each time output is initiated. PLOTRC provides a series of CalComp plotter routines. RWSBT manipulates information in binary form on tape, disk, or drum physical devices. VAMPIR provides the complete setup of linear graphs to be produced on a digital plotter.

32522 (ESTSC–000218IBMPC01) **BOILER PERF MODEL3.0: Fossil-fired boilers.** Winslow, J.C. (USDOE, Pittsburgh Energy Technology Center, PA (United States)). USDOE Pittsburgh Energy Technology Center, PA (United States). 1 May 1992. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC88400. Source: ESTSC.

Description: IBM PC; DOS 3.1; Microsoft QuickBASIC; 5 3.5 Diskettes. The BOILER PERFORMANCE MODEL source is not available.

The BOILER PERFORMANCE MODEL 3.0 is a package of thirteen programs for predicting the heat transfer performance of fossil-fired utility boilers. The programs can model a wide variety of boiler designs, provide boiler performance estimates for coal, oil or gaseous fuels, determine the influence of slagging and fouling characteristics on boiler performance, and calculate performance factors for tradeoff analyses comparing boilers and fuels. Given a set of target operating conditions, the programs can estimate control settings, gas and steam operating profiles through the boiler, overall boiler efficiency, and fuel consumption. The programs are broken into three categories: data, calculation, and reports with a central processor program acting as the link allowing the user to access any of the data or calculation programs and easily move between programs. The calculations are divided among the following five programs: heat duty calculation, combustion calculation, furnace performance calculation, convection pass performance calculation, and air heater performance calculation. The programs can model subcritical or supercritical boilers, most configurations of convective passes including boilers that achieve final reheat steam temperature control by split back pass, boilers with as many as two reheat circuits and/or multiple attemperator stations in series, and boilers with or without economizers and/or air heaters. Either regenerative or tubular air heaters are supported. For wall-fired or tangentially-fired furnaces, the furnace performance program predicts the temperature of the flue gases leaving the furnace. It accounts for variations in excess air, gas recirculation, burner tilt, wall temperature, and wall cleanliness. For boilers having radiant panels or platens above the furnace, the convective pass program uses the results of the combustion chamber calculation to estimate the gas temperature entering the convective pass.

32523 (ESTSC–000277MNFRM00) **SWEB: Scientific Workstation Evaluation Benchmark.** Raffenetti, R.C. (Argonne National Lab., IL (United States)). Argonne National Lab., IL (United States). 2 Apr 1984. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (NESC–9717). Source: ESTSC.

Description: MAINFRAMES; Machine Independent; FORTRAN 77; 1 Mag Tape.

The SCIENTIFIC WORKSTATION EVALUATION BENCHMARK software includes 16 programs which are executed in a well-defined scenario to measure the following performance capabilities of a scientific workstation: implementation of FORTRAN77, processor speed, memory management, disk I/O, monitor (or display) output, scheduling of processing (multiprocessing), and scheduling of print tasks (spooling). The benchmark programs are: DK1, DK2, and DK3, which do Fourier series fitting based on spline techniques; JC1, which checks the FORTRAN function routines which produce numerical results; JD1 and JD2, which solve dense systems of linear equations in double and single-precision, respectively; JD3 and JD4, which perform matrix multiplication in single and double-precision, respectively; RB1, RB2, and RB3, which perform substantial amounts of I/O processing on files other than the input and output files; RR1, which does intense single-precision floating-point multiplication in a tight loop; RR2, which initializes a 512x512 integer matrix in a manner which skips around in the address space rather than initializing each consecutive memory cell in turn; RR3, which writes alternating text buffers to the output file; RR4, which evaluates the timer routines and demonstrates that they conform to the specification; and RR5, which determines whether the workstation is capable of executing a 4-megabyte program.

32524 (ESTSC–000323I037000) **SAGEWASP: Optimal electric utility expansion.** Jenkins, R.T. (Tennessee Valley Authority, Knoxville, TN (United States)); Joy, D.S. Oak Ridge National Lab., TN (United States). 1 Jul 1974. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-26. (NESC–744). Source: ESTSC.

Description: IBM370; The program was developed on theFORTRAN IV; 1 Mag Tape. Eleven disk files are created by the program and up to six of these are used by an individual program.

SAGE-WASP is designed to find the optimal generation expansion policy for an electrical utility system. New units can be automatically selected from a user-supplied list of expansion candidates which can include hydroelectric and pumped-storage projects. The existing system is modeled. The calculational procedure takes into account user restrictions to limit generation configurations to an area of economic interest. The optimization program reports whether the restrictions acted as a constraint on the solution. All expansion configurations considered are required to pass a user-supplied reliability criterion. The discount rate and escalation rate are treated separately for each expansion candidate and for each fuel type. All expenditures are separated into local and foreign accounts, and a weighting factor can be applied to foreign expenditures.

32525 (ESTSC–000324SUN0000) **EQ3/6 V7.0: Geochemical modeling of aqueous systems.** Wolery, T.J. (Lawrence Livermore National Lab., CA (United States)). Lawrence Livermore National Lab., CA (United States). 10 Dec 1990. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Source: ESTSC.

Description: SUN; UNIX, generally speaking. VMS anANSI FORTRAN 77; 2 3.5 diskettes. EQ3NR input files end in .3i, EQ6 input files end in .6i. This is a recommended convention, and it is required in order to run these codes using the RUNEQ36 script. The data file names have the form exemplified by data0.comR10. Here com is one of the five data file descriptors and R10 is a stage number(a configuration control identifier). This general form is required to run the RUNEQPT script. Text files in the package end in .txt. FORTRAN source files end in .fsc. The EQLIB library which is part of the package, supports the EQPT,EQ3NR and EQ6 codes.

EQ3/6 is a software package for geochemical modeling of aqueous systems. This description pertains to version 7.0. The major components of the package include: EQ3NR a speciation-solubility code; EQ6, a reaction path code which models water/rock interaction or fluid mixing in either a pure reaction progress mode or a time mode; EQPT, a data file preprocessor; EQLIB, a supporting software library; and five supportingthermodynamic data files. The software deals with the concepts of thermodynamic equilibrium, thermodynamic disequilibrium, and reaction kinetics. The five supporting data files contain both standard state and activity coefficient-related data. Three support the use of the Davies or B-dot equations for the activity coefficients; the other two support the use of Pitzes's equations. The temperature range of the thermodynamic data on the data files varies from 25 degrees C only to 0-300 degrees C. EQ3NR is useful for analyzing groundwater chemistry data, calculating solubility limits, and determining whether certain reactions are in states of partial equilibrium or disequilibrium. It is also required to initialize an EQ6 calculation. EQ6 models the consequences of reacting an aqueous solution with a specified set of reactants. It can also model fluid mixing and the effects of changes in temperature. This code operates in a pure reaction progress frame (e.g., makes equilibrium step calculations with no time variable) or in a time frame.

32526 (ESTSC–000324SUN0001) **EQ3/6 V7.1: Geochemical modeling of aqueous systems.** Wolery, T.J. (Lawrence Livermore National Lab., CA (United States)). Lawrence Livermore National Lab., CA (United States). 1 Sep 1992. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (NESC–886). Source: ESTSC.

Description: SUN; UNIX, generally speaking. VMS anANSI FORTRAN 77; 2 3.5 diskettes. EQ3NR input files end in .3i, EQ6 input files end in .6i. This is a recommended convention, and it is required in order to run these codes using the RUNEQ36 script. The data file names have the form exemplified by data0.comR10. Here com is one of the five data file descriptors and R10 is a stage number(a configuration control identifier). This general form is required to run the RUNEQPT script. Text files in the package end in .txt. FORTRAN source files end in .fsc. The EQLIB library which is part of the package, supports the EQPT,EQ3NR and EQ6 codes.

EQ3/6 is a software package for geochemical modeling of aqueous systems. This description pertains to version 7.1. It differs from version 7.0 in that a number of bugs have been fixed, most of which pertain to portability. It also contains a newer set of supporting data files. The major components of the package include: EQ3NR a speciation-solubility code; EQ6, a reaction path code which models water/rock interaction or fluid mixing in either a pure reaction progress mode or a time mode; EQPT, a data file preprocessor; EQLIB, a supporting software library; and five supporting thermodynamic data files. The software deals with the concepts of thermodynamic equilibrium, thermodynamic disequilibrium, and reaction kinetics. The five supporting data files contain both standard state and activity coefficient-related data. Three support the use of the Davies or B-dot equations for the activity coefficients; the other two support the use of Pitzes's equations. The temperature range of the thermodynamic data on the data files varies from 25 degrees C only to 0-300 degrees C. EQPT is a data file preprocessor. EQ3NR is a speciation solubility code that is useful for analyzing groundwater chemistry data, calculating solubility limits, and determining whether certain reactions are in states of partial equilibrium or disequilibrium. It is also required to initialize an EQ6 calculation. EQ6 is a reaction-path code. It models the consequences of reacting an aqueous solution with a specified set of reactants. It can also model fluid mixing and the effects of changes in temperature. This code operates in a pure reaction progress frame (e.g., makes equilibrium step calculations with no time variable) or in a time frame.

32527 (ESTSC–000369MNFRM00) **LFK: Livermore FORTRAN kernel computer test.** McMahon, F.H. (Lawrence Livermore National Lab., CA (United States)). Lawrence Livermore National Lab., CA (United States). 1 Dec 1986. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (NESC–9426). Source: ESTSC.

Description: MAINFRAMES; Machine Dependent; FORTRAN 77 (84%) and C (16%); 1 Mag Tape.

LFK, the Livermore FORTRAN Kernels, is a computer performance test that measures a realistic floating-point performance range for FORTRAN applications. Informally known as the Livermore Loops test, the LFK test may be used as a computer performance test, as a test of compiler accuracy (via checksums) and efficiency, or as a hardware endurance test. The LFK test, which focuses on FORTRAN as used in computational physics, measures the joint performance of the computer CPU, the compiler, and the computational structures in units of Megaflops/sec or Mflops. A C language version of subroutine KERNEL is also included which executes 24 samples of C numerical computation. The 24 kernels are a hydrodynamics code fragment, a fragment from an incomplete Cholesky conjugate gradient code, the standard inner product function of linear algebra, a fragment from a banded linear equations routine, a segment of a tridiagonal elimination routine, an example of a general linear recurrence equation, an equation of state fragment, part of an alternating direction implicit integration code, an integrate predictor code, a difference predictor code, a first sum, a first difference, a fragment from a two-dimensional particle-in-cell code, a part of a one-dimensional particle-in-cell code, an example of how casually FORTRAN can be written, a Monte Carlo search loop, an example of an implicit conditional computation, a fragment of a two-dimensional explicit hydrodynamics code, a general linear recurrence equation, part of a discrete ordinates transport program, a simple matrix calculation, a segment of a Planckian distribution procedure, a two-dimensional implicit hydrodynamics fragment, and determination of the location of the first minimum in an array.

32528 (ESTSC–000392C017600) **VERTPAK1: Code verification analytic solution.** Golis, M.J. (Battelle Columbus Div., OH (United States)). Battelle, Columbus, OH (United States). 1 Apr 1983. Sponsored by USDOE, Washington, DC (United States). (NESC–9826). Source: ESTSC.

Description: CDC CYBER176; NOS 1.4 (CDC CYBER176); NOS 2.5.FORTRAN IV; 1 Mag Tape.

VERTPAK1 is a package of analytical solutions used in verification of numerical codes that simulate fluid flow, rock deformation, and solute transport in fractured and unfractured porous media. VERTPAK1 contains the following: BAREN, an analytical solution developed by Barenblatt, Zhelton and Kochina (1960) for describing transient flow to a well penetrating a (double porosity) confined aquifer; GIBMAC, an analytical solution developed by McNamee and Gibson (1960) for describing consolidation of a semi-infinite soil medium subject to a strip (plane strain) or cylindrical (axisymmetric) loading; GRINRH, an analytical solution developed by Gringarten (1971) for describing transient flow to a partially penetrating well in a confined aquifer containing a single horizontal fracture; GRINRV, an analytical solution developed by Gringarten, Ramey, and Raghavan (1974) for describing transient flow to a fully penetrating well in a confined aquifer containing a single vertical fracture; HART, an analytical solution given by Nowacki (1962) and implemented by HART (1981) for describing the elastic behavior of an infinite solid subject to a line heat source; LESTER, an analytical solution presented by Lester, Jansen, and Burkholder (1975) for describing one-dimensional transport of radionuclide chains through an adsorbing medium; STRELT, an analytical solution presented by Streltsova-Adams (1978) for describing transient flow to a fully penetrating well in a (double porosity) confined aquifer; and TANG, an analytical solution developed by Tang, Frind, and Sudicky (1981) for describing solute transport in a porous medium containing a single fracture.

32529 (ESTSC–000418C017000) **GRENADE: 3d multigp diffusion Green's function.** Costescu, C. (Institute for Nuclear Power Reactors, Pitesti (Romania)). Institutul de Reactori Nucleari Energetici, Pitesti (Romania). 1 Oct 1985. Sponsored by Institutul de Reactori Nucleari Energetici, Pitesti (Romania). (NESC–9625). Source: ESTSC.

Description: CDC CYBER170; NOS 1.4; FORTRAN IV; 1 Mag Tape. GRENADE makes use of CDC operating system routines

(DATE, TIME, and SECOND),mass storage input/output subroutines (OPENMS, WRITMS, READMS, and CLOSMS), and the dynamic memory allocation system subprograms (CMMALF and LOCF). The bulk of the data kept in the high speed memory is organized in arrays corresponding to a particular x-y plane. Data for all x-y planes are stored on mass storage random access files.

GRENADE is designed to solve the static diffusion equation for neutrons in multidimensional problems, assuming Cartesian geometry. The program calculates the flux and power distributions and k-effective, the effective neutron multiplication factor.

32530 (ESTSC–000443I036000) **AISITE2: Parametric site requirement study.** Blaine, R.A. (Rockwell International Rocketdyne Div., Canoga Park, CA (United States)). IBM Scientific Center, Palo Alto, CA (United States). 1 Sep 1964. Sponsored by USDOE, Washington, DC (United States). (NESC–172). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: IBM360; OS/360; FORTRAN IV; 1 Mag Tape. Dummy routines can be used for SC-4020 subroutines GRAPH and AICRT3, or these routines can be rewritten.

AISITE2 is largely based on methods proposed by the AEC in TID-14844 but differs in certain of the assumptions and models. The code automatically varies any one of 46 parameters such as reactor power, building leak rate, iodine clean-up rate, and halogen filter efficiency, computing the exclusion area, and low population boundary zones as functions of that parameter. The edit includes dose vs. distance data, fractional contribution by isotope group to the inhalation dose, and critical distances providing both printed and graphical data. Three models are available for fission product release with up to four levels of containment.

32531 (ESTSC–000448I037000) **APARNA2: 1-d integral neutron transport slab.** Vaidyanathan, R. (Atomic Energy Establishment, New Delhi (India)). Atomic Energy Establishment, Trombay (India). 1 Apr 1977. Sponsored by Atomic Energy Establishment, Trombay (India). (NESC–878). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: IBM370; OS/370; FORTRAN IV; 1 Mag Tape.

APARNA2 solves the one-dimensional integral neutron transport equation with anisotropic scattering in slab geometry.

32532 (ESTSC–000454C660000) **LEOPARDSPOTS: Spectrum calc with depletion.** Handly, B. (University of Texas, Austin (United States)); Hwang, W.G. Texas Univ., Austin, TX (United States). 1 Feb 1990. Sponsored by USDOE, Washington, DC (United States). (NESC–279). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: CDC6600; NOS2.4.3; FORTRAN IV. IBM360 FORTRAN IV H-level compiler library file.

LEOPARD is a unit cell homogenization and spectrum generation (MUFT-SOFOCATE type) program with a fuel depletion option.

32533 (ESTSC–000454I036000) **LEOPARDSPOTS: Spectrum calc with depletion.** Barry, R.F. (Westinghouse Electric Corporation, Pittsburgh, PA (United States)). Westinghouse Electric Corp., Pittsburgh, PA (United States). Atomic Power Div. 1 Feb 1977. Sponsored by USDOE, Washington, DC (United States). (NESC–279). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: IBM360; OS/360; FORTRAN IV(H). IBM360 FORTRAN IV H-level compiler library file.

LEOPARD is a unit cell homogenization and spectrum generation (MUFT-SOFOCATE type) program with a fuel depletion option.

32534 (ESTSC–000454U110800) **LEOPARDSPOTS: Spectrum calc with depletion.** Krug, H.E.P. (US Nuclear Regulatory Commission, Washington, DC (United States)). Jersey Nuclear Co., Richland, WA (United States). 1 Feb 1977. Sponsored by USDOE, Washington, DC (United States). (NESC–279). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: UNIVAC1108; EXEC2; FORTRAN V. IBM360 FORTRAN IV H-level compiler library file.

LEOPARD is a unit cell homogenization and spectrum generation (MUFT-SOFOCATE type) program with a fuel depletion option.

32535 (ESTSC–000456U110000) **SUBDOSA: External dose airborne radionuclides.** Strenge, D.L. (Pacific Northwest Lab., Richland, WA (United States)); Watson, E.C.; Houston, J.R. Oak Ridge National Lab., TN (United States). 1 Jan 1981. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (NESC–924). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: UNIVAC1100; EXEC8; FORTRAN; 1 Mag Tape. This program should be compiled with the ASCII FORTRAN (FTN) compiler.

SUBDOSA calculates external gamma and beta doses to individuals from the accidental release of radionuclides to the atmosphere. Doses are calculated as a function of: quantity released, duration of release, atmospheric conditions during the release, and horizontal distance from the release point. Doses from both gamma and beta radiation are calculated as a function of depth in tissue, summed and reported as skin, eye, gonadal, and total body dose. Doses are calculated within each of several release time intervals with separate nuclide inventories and atmospheric dispersion conditions used for each interval. Radioactive decay using a chain decay scheme with branching to account for transitions to and from isomeric states is considered during the release. The program computes normalized air concentrations at ground level as a function of distance from the point of release.

32536 (ESTSC–000457U110000) **DACRIN: Radiation organ dose from inhalation.** Houston, J.R. (Pacific Northwest Lab., Richland, WA (United States)); Strenge, D.L.; Watson, E.C. Oak Ridge National Lab., TN (United States). 1 Dec 1974. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (NESC–923). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: UNIVAC1100; EXEC8; FORTRAN; 1 Mag Tape. This program should be compiled with the ASCII FORTRAN (FTN) compiler.

DACRIN is designed to provide rapid and consistent estimates of the effective radiation dose to the human respiratory tract and other organs resulting from the inhalation of radioactive aerosols. The program will calculate the effective radiation dose to any of 18 organs and tissues from inhalation of any one or a combination of radionuclides considered by the International Commission on Radiological Protection (ICRP). Input to the program consists of a few program control variables, the duration of inhalation exposure, ventilation rate, the time interval within which the dose is delivered, the organs of interest, the quantity of the radionuclide inhaled, its solubility class and particle size, and, when an atmospheric dispersion model is invoked, the additional parameters required for the model selected. Output provided by DACRIN consists of the effective radiation dose to the specified organs at selected time intervals for each radionuclide inhaled as indicated by the input data.

32537 (ESTSC–000458I037000) **CURIE: Fission product inventory decay history.** Klickman, A.E. (Argonne National Lab., IL (United States)); Froehle, P.H. Argonne National Lab., IL (United States). 1 Aug 1978. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (NESC–196). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: IBM370; OS/370; FORTRAN IV; 1 Mag Tape.

CURIE calculates the fission product inventory decay history for fuel that has been in operation for a specified duration. The inventory decay history is provided for specified nuclides and elements, as well as the total fission products.

32538 (ESTSC–000463C760000) **LDEF-SS: Two-phase fluid flow in spray dryers.** O'Rourke, P.J. (Los Alamos National Lab., NM (United States)). Los Alamos National Lab., NM (United States). 1 Jul 1982. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (NESC–1027). Source: ESTSC.

Description: CDC7600; LTSS (CDC7600); NOS 1.4 (CDC CYB-FORTRAN 77; 1 Mag Tape. Due to the iterative nature of the calculations in LDEF-SS, machine round-off error may produce slightly different results on different machines. For the CDC version, the FORTRAN compiler option, ROUND, should be invoked to duplicate the sample problem output. This version includes NESC-provided dummy routines for the LANL Stromberg-Carlson plotter routines: ADV, DRV. GPLOT, GRPHFTN, GRPHLUN, LIB4020, LINCNT, PLT, and SETFLSH, which should be replaced with suitable alternatives for the environment in which the program is being executed to obtain graphical output.

LDEF-SS solves the equations for the two-phase fluid flow in spray dryers. It calculates, by a particle method, the dynamics and vaporization of a single component liquid spray. The spray is fully-coupled to a two-component gas, consisting of an inert species and the vapor of the liquid. The effects of drop collisions and coalescence are included. The geometry is spatially two-dimensional and axisymmetric, and swirling motion is permitted about the dryer axis. A wide variety of dryer parameters, such as dryer size and geometry and atomizer size and speed, and operating conditions, such as gas-flow rates and temperatures, can be specified by user-supplied parameters. Program output includes contour, vector, and spray plots, supplemented by numerical results.

32539 (ESTSC–000463I303300) **LDEF-SS: Two-phase fluid flow in spray dryers.** Marks, M.D. (Dow Chemical, Midland, MI (United States)). Dow Chemical U.S.A., Midland, MI (United States). 1 Jul 1982. Sponsored by USDOE, Washington, DC (United States). (NESC–1027). Source: ESTSC.

Description: IBM3033; VM/CMS (IBM4331); MVS/TSO (IBM30FORTRAN 77 (88%) and BAL (12%); 1 Mag Tape. Due to the iterative nature of the calculations in LDEF-SS, machine round-off error may produce slightly different results on different machines. In the IBM3033 version, subroutines DTIME and DATES are written in assembly language; they return the time of day and date information, respectively. Proprietary CalComp plotting routines PLOT, PLOTS, NEWPEN, WHERE, NUMPEN, and SYMBOL, used to provide the graphic output in the IBM version, are not included and should be replaced with alternatives suited to the local computing environment for graphical output.

LDEF-SS solves the equations for the two-phase fluid flow in spray dryers. It calculates, by a particle method, the dynamics and vaporization of a single component liquid spray. The spray is fully-coupled to a two-component gas, consisting of an inert species and the vapor of the liquid. The effects of drop collisions and coalescence are included. The geometry is spatially two-dimensional and axisymmetric, and swirling motion is permitted about the dryer axis. A wide variety of dryer parameters, such as dryer size and geometry and atomizer size and speed, and operating conditions, such as gas-flow rates and temperatures, can be specified by user-supplied parameters. Program output includes contour, vector, and spray plots, supplemented by numerical results.

32540 (ESTSC–000464I308100) **PROGLOOK: User program performance monitor.** Johnson, R.H. (Stanford Linear Accelerator Center, CA (United States)). Stanford Linear Accelerator Center, Menlo Park, CA (United States). 15 May 1976. Sponsored by USDOE, Washington, DC (United States). (NESC–642). Source: ESTSC.

Description: IBM3081; OS/360; FORTRAN IV and Assembly language; 1 Mag Tape. PROGLOOK monitoring overhead is on the order of 6 percent. PROGLOOK consists of two programs PROGTIME and PROGLOOK. PROGTIME is an Assembly language program which uses the interval timer to catch a picture of any program running under it and records this information in a data set, PROGLOOK is a FORTRAN program which uses the data set produced by PROGTIME to create the summary reports and plots.

PROGLOOK makes it possible to monitor the execution of virtually any OS/MVT or OS/VS2 Release 1.6 load module. The main reason for using PROGLOOK is to find out which portions of a code use most of the CPU time so that those parts of the program can be rewritten to reduce CPU time. For large production programs, users have typically found it possible to reduce CPU time by 10 to 30 percent without changing the program's function.

32541 (ESTSC–000465I036000) **AILMOE: X-section calc elastic scat resonances.** Blaine, R.A. (IBM, Palo Alto, CA (United States)). IBM Scientific Center, Palo Alto, CA (United States). 1 Apr 1966. Sponsored by USDOE, Washington, DC (United States). (NESC–147). Source: RADIATION SHIELDING INFORMATION CENTER.

Description: IBM360; OS/360; FORTRAN IV (H); 1 Mag Tape. Non-IBM users must provide their own means for reading past a tape mark. This function is provided by the file function at NAA. IBM System/360 users will need to modify the data definition (DD) cards to conform with the standards of their installations. The distributed procedure assumes that AILMOE resides in the link library with program name W00009. The data set name for the coarse group library is W00009.ANLXEC and for the Legendre coefficient library is W00009.ANLLEG. The remainder of the data sets are explained in the AI installation environment report. This procedure must reside in the PROCLIB with member name W00009 to function as described in the System/360 conversion notice. FORTRAN data set reference number 14 is used for the punched output.

AILMOE is a modified form of the ANL ELMOE program. The Fourier transform of the fast neutron flux is found for a mixture of moderators heavier than hydrogen with the moderator scattering law rigorously accounted for.

32542 (ESTSC/NRC–000102IBMPC00) **SADDE-MOD1: Scaled absorbed dose distribution evaluator.** Reece, W.D. (Pacific Northwest Laboratory, Richland, WA (United States)); Miller, S.D.; Durham, J.S. Battelle Pacific Northwest Lab., Richland, WA (United States). 1 Jan 1989. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. Source: ESTSC.

Description: IBM PC; PC-DOS; FORTRAN77; 1 5.25 Diskette.

SADDE generates data files for the VARSKIN code from calculated beta-ray spectra, allowing users to more readily and accurately calculate beta skin dose.

32543 (ESTSC/NRC–000106IBMPC00) **VARSKIN: Dose calculation of contamination of the skin.** Reece, W.D. (Pacific Northwest Lab, Richland, WA (United States)). Battelle Pacific Northwest Lab., Richland, WA (United States). 1 Aug 1987. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. Source: ESTSC.

Description: IBM PC; DOS; FORTRAN 77; 1 5.25 Diskette.

VARSKIN computes the radiation dose to the skin from radioactive contamination of the skin. The dose is computed at a specified depth from a source, ranging in size from a point to a disk having a 100-cm squared area.

32544 (ESTSC/NRC–000109IBMPC00) **IRDAM: Interactive rapid dose assessment model.** Poeton, R.W. (Pacific Northwest Lab., Richland, WA (United States)); Moeller, M.P.; Laughlin, G.J.; Desrosiers, A.E. Battelle Pacific Northwest Lab., Richland, WA (United States). 1 May 1983. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. Source: ESTSC.

Description: IBM PC; DOS; BASIC; 1 5.25 Diskette.

IRDAM is a micro-computer based program for rapidly assessing the radiological impact of an accident at a nuclear power plant.

32545 (ESTSC/NRC–000125D860000) **SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air.** Lampley, C.M. (Radiation Research Associates, Inc., Fort Worth, TX (United States)); Andrews, C.M.; Wells, M.B. Radiation Research Associates, Inc., Fort Worth, TX (United States). 1 Sep 1988. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. Source: ESTSC.

Description: DEC VAX8600; VMS; FORTRAN 77; 1 Mag Tape.

SKYSHINE was designed to aid in the evaluation of the effects of structure geometry on the gamma-ray dose rate at given detector positions outside of a buliding housing gamma-ray sources. The program considers a rectangular structure enclosed by four walls and a roof. Each of the walls and the roof of the building may be subdivided into up to nine different areas, representing different materials or different thicknesses of the same material for those positions of the wall or roof. Basic sets of iron and concrete slab transmission and reflection data for 6.2 MeV gamma-rays are part of the SKYSHINE block data. These data, as well as parametric air transport data for line-beam sources at a number of energies between 0.6 MeV and 6.2 MeV and ranges to 3750 ft, are used to estimate the various components of the gamma-ray dose rate at positions outside of the building. The gamma-ray source is assumed to be a 6.2 MeV point-isotropi source. SKYSHINE-III provides an increase in versatility over the original SKYSHINE code in that it addresses both neutron and gamma-ray point sources. In addition, the emitted radiation may be characterized by an energy emission spectrum defined by the user. A new SKYSHINE data base is also included.

32546 (ESTSC/NRC–000360C660000) **DISPERS: Mathematical models for dispersion of radionuclides.** Codell, R.B. (U.S Nuclear Regulatory Commission, Washington, DC (United States)); Whelan, G.; Key, K.T. Pacific Northwest Lab., Richland, WA (United States). 1 Jun 1982. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. (CCC–454). Source: ESTSC.

Description: CDC6600; Machine Dependent; FORTRAN IV, BASIC II; 1 Mag Tape.

DISPERS computes the fate of routinely or accidentally released radionuclides in surface water and groundwater.

32547 (ESTSC/NRC–000360IPS0200) **DISPERS: Mathematical models for dispersion of radionuclides.** Codell, R.B. (US Nuclear Regulatory Commission, Washington, DC (United States)). Nuclear Regulatory Commission, Washington, DC (United States). 1 Jun 1982. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. (CCC–454). Source: ESTSC.

Description: IBM PS/2; Machine Dependent; FORTRAN IV, BASIC II; 1 3.5 Diskette.

DISPERS computes the fate of routinely or accidentally released radionuclides in surface water and groundwater.

32548 (ESTSC/NRC–000362DG00000) **METD: Computer code systems to use with meteorological data.** Snell, W. (U.S. Nuclear Regulatory Commission, Washington, DC (United States)). Nuclear Regulatory Commission, Washington, DC (United States). 1 Jul 1982. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. (PSR–197). Source: ESTSC.

Description: DATA GENERAL; Machine Dependent; FORTRAN IV; 1 Mag Tape.

The Nuclear Regulatory Commission receives hour by hour meteorological data on magnetic tapes in a specified format. The computer codes in this collection are used by the NRC meteorology staff to examine, assess and utilize these hourly values of meteorological data.

32549 (ESTSC/NRC–000362I303300) **METD: Computer code systems to use with meteorological data.** Snell, W. (U.S. Nuclear Regulatory Commission, Washington, D.C. (United States)). Nuclear Regulatory Commission, Washington, DC (United States). 1 Jul 1982. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. (PSR–197). Source: ESTSC.

Description: IBM3033; Machine Dependent; FORTRAN IV; 1 Mag Tape.

The Nuclear Regulatory Commission receives hour by hour meteorological data on magnetic tapes in a specified format. The computer codes in this collection are used by the NRC meteorology staff to examine, assess and utilize these hourly values of meteorological data.

32550 (FASAC-TAR–92019706) **Non-US artificial neural network research: FASAC special study.** Davidson, R.B. Science Applications International Corp., McLean, VA (United States). Foreign Applied Sciences Assessment Center. Oct 1991. 92p. Source: OSTI; Science Applications International Corp., 1710 Goodridge Drive, P.O. Box 1303, McLean, VA 22102.

This assessment was undertaken to examine for US Government research and development sponsors (and for Government policy-makers and analysts who must be aware of foreign scientific and technological capabilities) the recent range, quality, and accomplishments of non-US artificial neural network research and development activities. It records the project's initial assessments of major artificial neural network research and development activities in Western Europe, Japan, and the Soviet Union, where the largest, most organized efforts are proceeding or where potential military applications are of interest to US policy-makers. We plan to issue updated versions of this report periodically, as more research and development activities (in more places) are examined and as the efforts assessed in this report succeed or fail. This report focuses on artificial neural networks as an information processing technology, the goal of which is design and production of powerful computers for appropriate applications.

32551 (JAERI-M–92-012, pp. 329-345) **Validation of IMPAIR 2 code using ACE-test results from the Radioiodine Test Facility (RTF).** Furrer, M. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)); Cripps, R.C. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373–: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The IMPAIR 2 (Iodine Matter Partitioning And Iodine Retention) code is based essentially on clean-condition data. Since the original version was published (1989), improvements are made with the aim to attempt a sufficiently realistic description of postulated iodine chemical conditions prevalent after a hypothetical severe accident in containment using a minimum of differential equations which define the important iodine reactions. This code considers 6 iodine species in 21 differential equations. It also contains code to model relevant physico-chemical behaviour: transport from containment (time-dependent accidental leakage or intentional filtered venting simulation), droplet carry-over, liquid and gas phase deposition (on paint surfaces) and revolatilization (including surface-formed organic iodine), aerosol phase transfer and droplet precipitation. The ACE/RTF Test are one of the most important sources for accident relevant conditions. An examination of the thermodynamic parameters of ACE/RTF Test 1 led to the addition of the Higher Molecular Weight organic Iodides (HMWI). The radiolysis reactions, especially the pH-dependent iodine oxidation and iodate reduction reactions, are revised using data from the RTF Tests and other current literature. (author).

32552 (JINR-E–11-91-353) **Computation of Green function of the Schroedinger-like partial differential equations by the numerical functional integration.** Lobanov, Yu.Yu.; Shahbagian, R.R.; Zhidkov, E.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1991. 26p. Order Number DE92644651. Source: OSTI; NTIS (US Sales Only); INIS.

A new method for numerical solution of the boundary problem for Schroedinger-like partial differential equations in R^n is elaborated. The method is based on representation of multidimensional Green function in the form of multiple functional integral and on the use of approximation formulas which are constructed for such integrals. The convergence of approximations to the exact value is proved, the remainder of the formulas is estimated. Method reduces the initial differential problem to quadratures. 16 refs.; 7 tabs.

32553 (JINR-R–11-90-501) **Algorithm and program for solution of the Sturm-Liouville problem using the high order accuracy spline scheme.** Zhanlav, T.; Puzynin, I.V.; Smirnov, Yu.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1990. 14p. (In Russian). Order Number DE92644652. Source: OSTI; NTIS (US Sales Only); INIS.

Algorithm and program for solution of the Sturm-Liouville problem for the second order linear homogeneous differential equation with homogeneous boundary conditions is presented. The algorithm is based on the four order accuracy spline-approximation method with using an equidistant step net for an independent variable. A generalized iteration Newton scheme with an inclusion function allowing to inverse a simple three-point operator at each iteration is used for the solution of the obtained non-linear five-point equation. The write-up of the program EVSA4 realising this algorithm and its parameters is presented. 19 refs.; 1 fig.; 5 tabs.

32554 (KCP–613-4972) **Design of a PCM data compressor: Final report.** Navickas, T.A. Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div. Aug 1992. 73p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00613. Order Number DE92019469. Source: OSTI; NTIS; GPO Dep.

Development of automated test equipment for an advanced telemetry system requires continuous monitoring of PCM data while exercising telemetry inputs. This requirements leads to a large amount of data that needs to be stored and later analyzed. For example, a data stream of 4 Mb/s and a test time of 30 min. would yield 900 Mb of raw data. Information must be stored to correlate the raw data to the test stimulus. This leads to a total of 1.8 Gb of data to be stored and analyzed. There is no method to analyze this amount of data in a reasonable time. A data compression method is needed to reduce the amount of data collected to a reasonable amount The solution to the problem was data reduction. Data reduction was accomplished by real time limit checking, time stamping, and smart software. Limit checking was accomplished by an eight-state finite-state machine and four compression algorithms. Time stamping was needed to correlate stimulus to the appropriate output for data reconstruction. The software was written in the C programming language with a DOS extender used to allow it to run in extended mode. A 94–98% compression in the amount of data gathered was accomplished using this method.

32555 (LA–12341-M) **GNETS: Graphical Network Security system user guide.** Stoltz, L.A. Los Alamos National Lab., NM (United States). Aug 1992. 85p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE92019707. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The GNETS system provides a means of evaluating the security of a computer network operating under DOE guidelines found, which in turn references other security documents. It is a PC-based system developed to be used by system security personnel to check the security of existing networks, to evaluate the security of proposed networks, and to increase the capability to conduct additional research on networked systems. GNETS allows the user to "build" a computer network graphically. As machines are added to the network, the intelligent graphical interface prompts the user for relevant machine characteristics and security information. As the computer network is created and depicted, a dynamic analysis process inspects the security of the network and warns the user of any security risks. The user can save the network that has been constructed and return to it later to review or modify it. The system is implemented in Zortech C++ for 286 PCs (and compatible microcomputers) with 550K RAM and a graphics display adaptor.

32556 (LA-UR–92-1463) **The performance realities of massively parallel processors: A case study.** Lubeck, O.M.; Simmons, M.L.; Wasserman, H.J. Los Alamos National Lab., NM (United States). [1992]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-921125–4: ACM/IEEE supercomputing conference, Minneapolis, MN (United States), 14-21 Nov 1992). Order Number DE92015211. Source: OSTI; NTIS; GPO Dep.

This paper presents the results of an architectural comparison of SIMD massive parallelism, as implemented in the Thinking Machines Corp. CM-2 computer, and vector or concurrent-vector processing, as implemented in the Cray Research Inc. Y-MP/8. The comparison is based primarily upon three application codes that represent Los Alamos production computing. Tests were run by porting optimized CM Fortran codes to the Y-MP, so that the same level of optimization was obtained on both machines. The results for fully-configured systems, using measured data rather than scaled data from smaller configurations, show that the Y-MP/8 is faster than the 64k CM-2 for all three codes. A simple model that accounts for the relative characteristic computational speeds of the two machines, and reduction in overall CM-2 performance due to communication or SIMD conditional execution, is included. The model predicts the performance of two codes well, but fails for the third code, because the proportion of communications in this code is very high. Other factors, such as memory bandwidth and compiler effects, are also discussed. Finally, the paper attempts to show the equivalence of the CM-2 and Y-MP programming models, and also comments on selected future massively parallel processor designs.

32557 (LA-UR–92-2580) **HIPPI and Fibre Channel.** Tolmie, D.E. Los Alamos National Lab., NM (United States). [1992]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-920966–1: 10. conference on computing in high energy physics, Annecy (France), 21-25 Sep 1992). Order Number DE92040346. Source: OSTI; NTIS; INIS; GPO Dep.

The High-Performance Parallel Interface (HIPPI) and Fibre Channel are near-gigabit per second data communications interfaces being developed in ANSI standards Task Group X3T9.3. HIPPI is the current interface of choice in the high-end and supercomputer arena, and Fibre Channel is a follow-on effort. HIPPI came from a local area network background, and Fibre Channel came from a mainframe to peripheral interface background.

32558 (ORNL/TM–11900) **Speedup properties of phases in the execution profile of distributed parallel programs.** Carlson, B.M. (Toronto Univ., ON (Canada). Computer Systems Research Institute); Wagner, T.D.; Dowdy, L.W.; Worley, P.H. Oak Ridge National Lab., TN (United States). Aug 1992. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019301. Source: OSTI; NTIS; GPO Dep.

The execution profile of a distributed-memory parallel program specifies the number of busy processors as a function of time. Periods of homogeneous processor utilization are manifested in many execution profiles. These periods can usually be correlated with the algorithms implemented in the underlying parallel code. Three families of methods for smoothing execution profile data are presented. These approaches simplify the problem of detecting end points of periods of homogeneous utilization. These periods, called phases, are then examined in isolation, and their speedup characteristics are explored. A specific workload executed on an Intel iPSC/860 is used for validation of the techniques described.

32559 (ORNL/TM–12147) **Standards for message-passing in a distributed memory environment.** Walker, D.W. Oak Ridge National Lab., TN (United States). Aug 1992. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (CONF-9204185–Summ.: 1. Center for Research on Parallel Computing (CRPC) workshop on standards for message passing in a distributed memory environment, Williamsburg, VA (United States), 29-30 Apr 1992). Order Number DE92019391. Source: OSTI; NTIS; GPO Dep.

This report presents a summary of the main ideas presented at the First CRPC Work-shop on Standards for Message Passing in a Distributed Memory Environment, held April 29-30, 1992, in Williamsburg, Virginia. This workshop attracted 68 attendees including representative from major hardware and software vendors, and was the first in a series of workshops sponsored by the Center for Research on Parallel Computation. The aim of this series of workshops is to develop and implement a standard for message passing on distributed memory concurrent computers, thereby making it easier to develop efficient, portable application codes for such machines. The report discusses the main issues raised in the CRPC workshop, and describes proposed desirable features of a message passing standard for distributed memory environments.

32560 (OUP–92-19) **A simple algorithm for large, nonlinear or singular least squares problems.** Myrheim, J. (NTH, Inst. for Fysikk, Trondheim (Norway)); Rue, H.; Bugge, L. Oslo Univ. (Norway). Fysisk Inst. Jun 1992. 10p. Order Number DE93602464. Source: OSTI; NTIS; INIS.

The authors describe how to use the conjugate gradient method with Jacobi pre-conditioning for solving linear or moderately nonlinear least squares problems. The algorithm is suitable for large but sparse problems, and it works even if the problem is ill-conditioned or singular. 4 refs., 3 tabs.

32561 (RFP–4614) **RFEDSCHK User's Manual (The RFEDS Lab Data Check routine), Environmental and Scientific Systems Information Resources: Version 1.00.** EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant. May 1992. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC34-90DP62349. Order Number DE92019357. Source: OSTI; NTIS; GPO Dep.

The RFEDS Laboratory Data Check routine (RFEDSCHK) performs checks of the off-site laboratory data to identify missing and/or incorrect data which may exist. The check routine is designed to assist the laboratories to correct deficiencies contained in the data before it is sent to the Rocky Flats Environmental Management Department, there-by improving the quality of the data being placed in RFEDS. If the data passes the checks with no errors, the data will be acceptable for placement into RFEDS and delivery of the electronic data to EG&G is appropriate. If errors are detected, the laboratory should correct the errors and perform the check again until the data is free of errors.

32562 (SAND-91-2907C) **RHALE: A MMALE shock physics code written in C++.** Budge, K.G.; Peery, J.S. Sandia National Labs., Albuquerque, NM (United States). [1991]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-921162-5: Hypervelocity impact symposium, Austin, TX (United States), 17-20 Nov 1992). Order Number DE92018271. Source: OSTI; NTIS; GPO Dep.

This paper describes RHALE, a multi-material arbitrary Lagrangian-Eulerian (MMALE) shock physics code. RHALE is the successor to CTH, Sandia's 3-D Eulerian shock physics code, and will be capable of solving problems that CTH cannot adequately address. We discuss the new Lagrangian capabilities of HALE, which include arbitrary mesh connectivity, superior artificial viscosity, and improved equations of state. We also discuss some of the issues we have encountered in the choice of an axisymmetric element technology and our resolution of these issues. We discuss the MALE algorithms that have been extended for arbitrary grids in both two and three dimensions and present the results of calculations that are of interest to the hypervelocity impact community. The MALE addition to HALE provides the accuracy of a Lagrangian code while allowing a calculation to proceed under very large distortions. Coupling an arbitrary quadrilateral or hexahedral grid to the MALE solution facilitates modeling of complex shapes with a minimum number of computational cells. HALE allows regions of a problem to be modeled with Lagrangian, Eulerian or ALE meshes. In addition, regions can switch from Lagrangian to ALE to Eulerian based on user input or mesh distortion. For ALE meshes, new node locations are determined with equipotential schemes. Element quantities are advected with donor, van Leer, or Super-B algorithms. Nodal quantities are advected with the second order SHALE or HIS algorithms. To facilitate the development of such a lengthy code, we choose to write in the C++ programming language. We feel that object-oriented programming techniques are superior to conventional programming techniques. However, we discuss a few of the efficiency problems we have encountered using these techniques and how we have addressed these problems.

32563 (SAND-92-1655C) **Optimization of expressions involving array classes.** Budge, K.G. Sandia National Labs., Albuquerque, NM (United States). [1992]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-9207136-1: American National Standards Institute (ANSI) X3J16/ISO WG21 meeting, Toronto (Canada), 12-18 Jul 1992). Order Number DE92019421. Source: OSTI; NTIS; GPO Dep.

C++ is rapidly gaining in popularity as a scientific programming language. The data encapsulation inherent in the class concept and the availability of operator overloading for compact representation of operations make it an ideal language for translating concepts in mathematical physics into computer code. Furthermore, its strong type checking and memory management features facilitate correct coding of algorithms. Unfortunately, C++ code which is written in the true spirit of the language is often very inefficient under current compiler implementations. Many of the inefficiency issues, such as unnecessary copy operations or proliferation of temporaries, have been well-characterized. Some may be alleviated by clever C++ coding, but others cannot be alleviated except by writing C-like code that sacrifices one or more of the best features of the language. This document describes a major source of efficiency problems in expressions using overloaded operators on array classes, and proposes certain minor modifications to the C++ language standard which will facilitate optimization of these expressions.

32564 (SAND-92-8515C) **TCP performance analysis for wide area networks.** Chen, H.Y.; Hutchins, J.A.; Testi, N. Sandia National Labs., Livermore, CA (United States). [1992]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DR00789. (CONF-921125-3: ACM/IEEE supercomputing conference, Minneapolis, MN (United States), 14-21 Nov 1992). Order Number DE92013565. Source: OSTI; NTIS; GPO Dep.

Even though networks have been getting faster, perceived throughput at the application level has not increased accordingly. In an attempt to identify many of the performance bottlenecks, we collected and analyzed data over a wide area network (WAN) at T3 (45 Mbps) bandwidth. The information gained will assist in designing new protocols and/or algorithms that are consistent with future high-speed requirements.

32565 (UCRL-JC-106562) **Construction of large-scale simulation codes using ALPAL: Generation of a hydrodynamics code module.** Cook, G.O. Jr.; Painter, J.F. Lawrence Livermore National Lab., CA (United States). Jan 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-910771-5: 13. IMACS world congress on computation and applied mathematics, Dublin (Ireland), 22-26 Jul 1991). Order Number DE92019601. Source: OSTI; NTIS; GPO Dep.

A Livermore Physics Applications Language (ALPAL) is a tool that automatically generates code to solve nonlinear integro-differential equations, given a very high-level specification of the equations to be solved and the numerical methods to be used. ALPAL is designed to handle the sort of complicated mathematical models used in very large scientific and engineering simulation codes. Other features of ALPAL include an interactive graphical front end, the ability to symbolically compute exact Jacobians for implicit methods, and a high degree of optimization in generated code. Here we show how ALPAL is used in practice by using it to construct a simple one-dimensional hydrodynamics code.

32566 (UCRL-JC-110011) **Distributed make (and more).** Fletcher, J.G. Lawrence Livermore National Lab., CA (United States). Mar 1992. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-921125-2: ACM/IEEE supercomputing conference, Minneapolis, MN (United States), 14-21 Nov 1992). Order Number DE92011972. Source: OSTI; NTIS; GPO Dep.

An infrastructure for general distributed programming among Unix systems has been implemented that is sufficient to permit the convenient distribution of both user-programmed applications and standard utilities, such as make. That is, make executed on one computer can cause programs to be run on other computers and determine their exit statuses. Although privacy is maintained, the user is not asked to supply his password and therefore need not remain attendant at this terminal. Installation of the infrastructure does not require "superuser" or other privilege.

32567 (UCRL-JC-111089) **Dynamic multimodal function optimization using genetic algorithms.** Cedeno, W. (Lawrence Livermore National Lab., CA (United States)); Vemuri, V. Lawrence Livermore National Lab., CA (United States). 20 Jul 1992. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9208118-1: 18. conference Latin American of information, Las Palmas de Gran (Spain), 31 Aug - 4 sep 1992). Order Number DE92019602. Source: OSTI; NTIS; GPO Dep.

Many optimization techniques work well for unimodal functions. If applied to multimodal functions, they tend to converge to only one of the many peaks. Optimization of multimodal functions becomes even more difficult if the function parameters change dynamically. Genetic algorithms have been successfully applied by several investigators for static optimization of multimodal functions. This modest success is primarily due to the ability of genetic algorithms to locate more than one peak. In this paper we introduce a combination of selection and replacement operators that is suitable for multimodal function optimization in a dynamic environment using various test functions, performance of this new operator is studied. Utility of this new operator to multimodal function optimization in a dynamic environment is described.

32568 (WSRC-IM-90-83-6-Rev.) **Reviews of computing technology: Fiber distributed data interface: Revision.** Johnson, A.J. Westinghouse Savannah River Co., Aiken, SC (United States). 1 Apr 1992. 36p. Sponsored by USDOE, Washington, DC

(United States). DOE Contract AC09-89SR18035. Order Number DE92019927. Source: OSTI; NTIS; GPO Dep.

This technology report describes Fiber Distributed Data Interface (FDDI) as a technology, looks at the applications of this technology, examines the current economics of using it, and describe activities and plans by the Information Resource Management Department to implement this technology at the Savannah River Site.

32569 (WSRC-IM-92-23) **Savannah River Site computing standards and guidelines reference.** Westinghouse Savannah River Co., Aiken, SC (United States). 1 Apr 1992. 110p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE92019347. Source: OSTI; NTIS; GPO Dep.

It is WSRC policy that site computing activities be based on standards. The primary reasons for defining the site's computing standards and guidelines are to promote interoperability of site computing systems and to facilitate the portability of programs, applications, and data between computer systems. This policy is necessary to obtain increased flexibility and cost effectiveness in carrying out the site mission. This report includes the following groups of computer technology standards: Operating Systems Services Technology; User Interfaces Services Technology; Program Services Technology; Data Management Services Technology; Data Interchange Services Technology; Graphics Services technology; Network Services Technology; and Hardware Interfaces Technology.

32570 (Y/CSD/INF-92/8) **Functional system design document for the Intelligent Inspection System (IIS).** Oak Ridge Y-12 Plant, TN (United States). 21 Jan 1992. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OS21400. Order Number DE92018240. Source: OSTI; NTIS; GPO Dep.

IIS (Intelligent Inspection system) is a martin Marietta Energy Systems Quality Services division project to design and implement a new generation inspection workstation/machine system to be used on all new and upgraded inspection machines for the next several years. The initial implementation will be on upgraded YZ inspection machines. These machines now utilize the dual processor (PDP-II/Allen Bradley combination) hardware and software. Portions of the hardware for these current systems are no longer available. Future implementations will include dual YZ, CMM and OMM systems, both upgrades and new. IIS project scope includes all of the inspection machine control hardware and software, all software to receive a part program, collect inspection data, analyze the data, output results, and the operator interface. Also included in the IIS scope are the operator interface and electronic data handling for the part programming interface and the shop floor interface.

9903 Information Handling

Refer also to citation(s) 30668, 30835, 31193, 31196, 31325, 31473, 32510, 32519

32571 (ANL/CP-76315) **Evolution of the scientific paper.** Harmon, J.E. Argonne National Lab., IL (United States). [1992]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209142-6: Institute of Electrical and Electronics Engineers (IEEE) international professional communications conference (IPCC): crossing frontiers, Santa Fe, NM (United States), 30 Sep 1992). Order Number DE92019696. Source: OSTI; NTIS; GPO Dep.

The first papers reporting original research results in technical periodicals and proceedings appeared in the late 17th century. Since that time, the typical scientific paper has evolved from a fairly simple document, accessible to a general audience, to a much more complex one, aimed at a specialized audience. The purpose of this article is to give an overview of what the first scientific papers were like and how they evolved to their present form and style. To facilitate this discussion, the scientific paper's development has arbitrarily been divided into four stages: the origin and formative years of the scientific paper (1665-1765), emergence of scientific papers written for specialized publications (1765-1865), development of the modem scientific paper (1865-1965), and hyperspecialization and computerization of the modem scientific paper (1965-?).

32572 (ANL/CP-76725) **Increasing the end user's productivity through seamless integration of applications with the database.** Parizadeh, K. Argonne National Lab., IL (United States). [1992]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9209160-3: International symposium on energy, environment and information management, Argonne, IL (United States), 15-18 Sep 1992). Order Number DE92019599. Source: OSTI; NTIS; GPO Dep.

End user's productivity is a critical issue in modem day offices. The first section of this paper will present some guidelines and methods to improve end user's productivity. The second section, presents an actual system.

32573 (ETDE/JP-mf-92562517, pp. 51-63) **Analysis and evaluation of information network system.** Nishi, Y. (Geological Survey of Japan, Tsukuba (Japan)). Geological Survey of Japan, Tsukuba, Ibaraki (Japan). Jan 1992. 133p. (In Japanese). In *Analysis and evaluation of data from the nationwide survey of geothermal exploration.* Order Number DE92562517. Source: OSTI; NTIS (US Sales Only).

In this report, the computer network system including geothermal resources information, which joints New Energy and Industrial Technology Development Organization (NEDO) and Geological Survey of Japan (GSJ), has been analyzed and evaluated on the basis of results obtained up to date. The network jointing NEDO and GSJ has been realized by combining uucp (unix unix copy) function normally attached to UNIX-OS, public line, and high performance modem. In addition, it was confirmed that data files can be successfully transferred using the high-speed modem through this network as the network using public line. However, the data with a large capacity of more than several tens mega-byte were not so well transfered via this network. Accordingly, it was pointed out that the support of functions except the file transfer would be important. 5 refs., 6 figs.,1 tab.

32574 (JAERI-M-92-012, pp. 381-395) **Modelling of iodine chemistry: The LIRIC database.** Wren, J.C. (Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment); Sagert, N.H.; Sims, H.E. Japan Atomic Energy Research Inst., Tokyo (Japan). Mar 1992. (CONF-9109373-: 3. CSNI workshop on iodine chemistry in reactor safety, Tokai (Japan), 11-13 Sep 1991). In *Proceedings of the third CSNI workshop on iodine chemistry in reactor safety.* 532p. Order Number DE92514925. Source: OSTI; NTIS; INIS.

The LIRIC (Library of Iodine Reactions in Containment) database was developed to provide a better understanding of the behaviour of iodine under conditions relevant to reactor accidents through mechanistic modelling. It has undergone significant changes since it was first presented at the last CSNI workshop on iodine chemistry and now includes better reaction kinetic data for various thermal and radiolysis iodine reactions, a revised mass transfer model and a new reaction set, which addresses some of the recent Radioiodine Test Facility (RTF) test results. This paper describes tests of the validity of some of the LIRIC reaction schemes and highlights where sensitivities are. The reaction set for water radiolysis seems satisfactory. The paper then discusses several important reactions of iodine species with hydrogen peroxide and, by modelling results from RTF experiments, suggests a plausible reaction model and range of rate constants. However, these reactions are not really understood sufficiently for mechanistic modelling purposes. Finally, the paper describes a crude reaction scheme for organic radiolysis reactions that has been added to test the possible effect of organic oxidation reactions on the pH, dissolved oxygen and iodine volatility. This reaction scheme also requires much more work before it is sufficiently well established for mechanistic modelling. (author).

32575 (K/CSD/TM-101) **Engineering Design Information System (EDIS) Information Services Division (ISD) Index Function: User's manual.** Schwarz, R.K. (ed.); Walker, C.T.; Cline, B.E.; Lucas, C.L. Oak Ridge K-25 Site, TN (United States). Aug 1992. 77p. Sponsored by USDOE, Washington, DC (United

States). DOE Contract AC05-84OT21400. Order Number DE92041242. Source: OSTI; NTIS; GPO Dep.

The Engineering Design Information System (EDIS) Information Services Division (ISD) Index Function is an interactive system developed for ISD personnel to perform indexing, maintenance, and retrieval of information about engineering documents. Section 2.0 of this manual gives an overview of the system structure, data, and functionality, as well as the hardware and security environment within which the system operates. Section 3.0 gives a detailed description of the interactive menus, screens, and prompts that provide access to the system functions and the requirements for data entry. Appendixes A-F are included to display data definitions, modification rules, help screen formats, explanation of system help and informational messages, code translations, and a report format.

32576 (ORNL/ER/Sub–87-99053/50) **Data Base Management Plan for the remedial investigation of Waste Area Grouping 5 at Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Oak Ridge National Lab., TN (United States); Bechtel National, Inc., Oak Ridge, TN (United States). Jul 1992. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE92019492. Source: OSTI; NTIS; INIS; GPO Dep.

The remedial investigation (RI) for Waste Area Grouping (WAG) 5 will involve gathering, verifying, analyzing, reporting, and archiving numerous types of field and analytical data. Field investigations will produce data documenting surficial and geophysical surveys, geologic and hydrogeologic logs, aquifer tests, water level measurements, geophysical logs, and stream and seepage flow measurements. Laboratory analyses will be performed on soil, surface water, groundwater, and sediment samples collected during field investigations. All data resulting from these activities will be contained in the Bechtel RI/feasibility study (FS) project data base and will be managed in accordance with the RI/FS Data Base Management Plan and this WAG-specific plan. This Data Base Management Plan describes the gathering, verifying, analyzing, reporting, and archiving of data generated during Bechtel's remedial investigation of Waste Area Grouping 5. This investigation will produce data documenting surficial surveys, geophysical surveys, geologic and hydrologic logs, aquifer tests, water level measurements, geophysical logs, and stream and seep flow measurements. Also, laboratory analyses will be performed on soil, surface water, groundwater, and sediment samples. The 1500 series of Bechtel project procedures, "Data Base Management," and the project Data Base Management Plan will be used to ensure that data are handled properly.

9904 Law

Refer also to citation(s) 31986

32577 (INIS-mf–13215, pp. 17-20) **Supervising radiation protection in Israel: A new arrangement.** Brener, S. (Ministry of the Enviroment Quality, Tel-Aviv (Israel)). Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

The new organization of Israel's radiation protection administration are presented.

32578 (INIS-mf–13215, pp. 21-23) **Radiation safety in Israel: Thoughts and expectations.** Litai, D. (Israel Atomic Energy Commission, Tel Aviv (Israel)). Israel Radiation Protection Association (Israel). Apr 1990. (In Hebrew). (CONF-9004359–: Symposium dedicated to factual problem in radiation safety, Hertzlia (Israel), 25 Apr 1990). In *Symposium dedicated to actual problems in radiation safety.* 60p. Order Number DE92644105. Source: OSTI; NTIS (US Sales Only); INIS.

The organizational model of the Israel administration of radiation protection is presented.

Corporate Author Index

This index lists the corporate authors responsible for issuing the documents in this publication which are identified primarily by report number. The corporate names are entered in standardized forms as defined in ETDE/PUB-3, *International Energy: Research Organizations 1986–1990.* Each entry under a corporate name includes the document title and citation number. Three items of information may appear in parentheses: (1) an abbreviation to identify the document type, such as a report; (2) the country of publication, indicated by International Organization for Standardization (ISO) country code; and (3) the language of the document if non-English (R;CA;In French). Author affiliations are not listed in this index.

A

- **Aalborg Boilers A/S, Aalborg (Denmark)**
  - Circulating fluidized bed with optimal control of process parameters to achieve better environmental conditions and flexibility in operation, 17:31408 (I;DK)
- **Aalborg Universitetscenter (Denmark). Inst. for Bygningsteknik**
  - Fatigue tests on glued laminated wood beams: Partial report 4: Testing of series C, 17:30856 (R;DK;In Danish)
- **Abo Akademi, Turku (Finland). Heat Engineering Lab.**
  - A comparison of numerical procedures for calculation of steady two- and three-dimensional two-phase flow, 17:31373 (R;FI)
  - A dimensional model for char combustion in a circulating fluidized bed, 17:30539 (R;FI)
  - A simulation model for time-dependent drying, devolatilization and combustion of a single solid fuel particle, 17:31376 (R;FI)
  - Estimation of air flow profile based on state measurements, 17:31372 (R;FI)
  - Experiences with numerical fluid flow and heat transfer calculations on multiprocessor computers: Lecture given at the Symposium on Chemical Engineering of the Finnish Chemical Congress in Helsinki, on November 9, 1989, 17:31374 (R;FI)
  - Model for blast furnace on-line simulation. Part 4: Application of the model to prediction, 17:31198 (R;FI)
  - Model for predicting the evolution of steel temperature in a continuous casting tundish on the basis of expert knowledge, 17:31199 (R;FI)
  - Numerical fluid flow and heat transfer calculations on multiprocessor systems, 17:31371 (R;FI)
  - Optimization of the heat recovery system of a paper machine, 17:31123 (R;FI)
  - Parallel computation of steady three-dimensional two-phase flows, 17:31375 (R;FI)
  - Reaction kinetics of coal combustion: A literature review, 17:30538 (R;FI)
  - Simulation of bioreactors: A literature review, 17:30800 (R;FI)
- **Advanced Cooling Technology, Inc., Lexington, KY (United States)**
  - Advanced Cooling Technology, Inc. quarterly technical progress report, 17:31097 (R;US)
- **Advanced Fuel Research, Inc., East Hartford, CT (United States)**
  - Application of integrated codes, 17:30434 (RA;US)
  - Comprehensive model development and evaluation, 17:30433 (RA;US)
  - Structure of a near-laminar coal jet flame, 17:30542 (RA;US)
  - Submodel development and evaluation, 17:30432 (RA;US)
- **AEA Environment and Energy, Harwell (United Kingdom)**
  - Coastal resuspension, 17:31684 (R;GB)
- **AEA Technology, Culham (United Kingdom)**
  - An engineering upgrade of the CWDD injector, 17:31472 (R;US)
- **Air Products and Chemicals, Inc., Allentown, PA (United States)**
  - Liquid Phase Methanol LaPorte PDU: Modification, operation, and support studies: Quarterly technical progress report No. 4, 1 April–30 June 1988, 17:30452 (R;US)
- **Alabama Univ., University, AL (United States). Dept. of Chemistry**
  - An EPR spin probe method for characterizing changes in the accessible regions of coal upon oxidation, 17:30461 (R;US)
- **Alaska Univ., Fairbanks, AK (United States). Geophysical Inst.**
  - Analysis of reservoir heterogeneities due to shallowing-upward cycles in carbonate rocks of the Pennsylvanian Wahoo Limestone of Northeastern Alaska: Annual report, October 1990–September 1991, 17:30560 (R;US)
- **Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div.**
  - Acid copper sulfate plating bath: Control of chloride and copper: Final report, 17:31320 (R;US)
  - Analysis of plasma-treated wire insulation, 17:31622 (R;US)
  - Design of a PCM data compressor: Final report, 17:32554 (R;US)
  - Development of a 1000 g, 10 ms mechanical shock test capability: Final report, 17:31405 (R;US)
  - Digital imaging systems: Final report, 17:31608 (R;US)
  - Miscellaneous Waste Stream strategy document, 17:30703 (R;US)
  - Pilot process waste assessment for the fireset area, 17:31621 (R;US)
  - Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report, 17:31131 (R;US)
  - Radar operations process waste assessment: Solder pot tinning, 17:31132 (R;US)
  - Standards for burrs?, 17:31233 (R;US)
- **Altamira Instruments, Inc., Pittsburgh, PA (United States)**
  - Synthesis of octane enhancers during slurry-phase Fischer-Tropsch: Quarterly technical progress report No. 5, October 1, 1991–December 31, 1991, 17:30454 (R;US)
- **American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States)**
  - A model for electron and beta energy deposition within trabecular bone, 17:31895 (RA;US)
  - A Monte Carlo simulation of boron neutron capture reactions in cells - Microdosimetric aspects, 17:31774 (RA;US)
  - A new approach to radiopharmaceutical dose assessment, 17:31882 (RA;US)
  - A new mathematical model of gastrointestinal transit incorporating age- and gender-dependent physiological parameters, 17:31890 (RA;US)
  - Absorbed dose calculations to blood and blood vessels for internally deposited radionuclides, 17:31891 (RA;US)
  - An alternative to convolution integrals for radiation absorbed dose calculations, 17:31905 (RA;US)
  - An approach to cellular level dosimetry using compartmental model analysis and dynamic PET, 17:31901 (RA;US)
  - Application of PET and compartmental modeling in estimation of cellular level microdosimetry: PET studies of I-124 labeled 3F8 MAb in human glioma, 17:31902 (RA;US)
  - Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein, 17:31892 (RA;US)
  - Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
  - Calculations of scaled dose kernels for electrons in tissue, 17:31896 (RA;US)
  - Choosing representative body sizes for reference adults and children, 17:31889 (RA;US)
  - Development and validation of a simple model for cellular and cell cluster dosimetry with practical application in targeted radionuclide therapy, 17:31907 (RA;US)
  - Distribution of ionic indium and gallium in pregnant and nonpregnant animals, 17:31885 (RA;US)

Dosimetry of ^{99m}Tc-P53, a new myocardial perfusion imaging agent, 17:31773 (RA;US)
Dosimetry of intrathecally administered radiopharmaceuticals, 17:31887 (RA;US)
Dynamic PET scanning and compartmental model analysis to determine cellular level radiotracer distribution in vivo, 17:31900 (RA;US)
Effective dose to the patient from radiopharmaceuticals calculated with the new ICRP tissue weighting factors, 17:31880 (RA;US)
Enhancement of radiation dose to the bone marrow from backscattering of electron sources, 17:31894 (RA;US)
External beam and radioimmunotherapy dosimetry comparison of colorectal xenografts, 17:31883 (RA;US)
Health and dosimetry considerations in the ICRP 1990 formulation of effective dose, 17:31879 (RA;US)
In vivo distribution and dosimetry of Tc-99m MIBI in man, 17:31906 (RA;US)
National standards for diagnostic and therapeutic nuclides, 17:31884 (RA;US)
Point-pair distributions for internal dosimetry, 17:31897 (RA;US)
Prediction of radiation dose to the GI tract from analysis of blood and liver time-activity curves, 17:31888 (RA;US)
Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)
Radiation dosimetry for Tc-99m MAG3 in adults and children, 17:31903 (RA;US)
Radioarsenic labeled compounds: Synthesis and biological evaluation for potential application in nuclear imaging and therapy, 17:31772 (RA;US)
Reevaluation of S-values considering electron transport, 17:31893 (RA;US)
Special aspects of positron dosimetry, 17:31899 (RA;US)
SPECTDOSE: A computerized radiation dosimetry methodology for use with radiolabeled antibodies using quantitative SPECT, 17:31898 (RA;US)
The application of the distance histogram in microdosimetry for evaluating heterogeneity, 17:31909 (RA;US)
The interpretation of animal data in the calculation of doses from new radiolabeled compounds, 17:31881 (RA;US)
X-ray and radioiodine dose to thyroid follicular cells, 17:31908 (RA;US)

Ames Lab., IA (United States)
Ductile fracture process of discontinuous fiber reinforced composites, 17:31272 (R;US)
Enhancement of ion transmission and reduction of background and interferences in inductively coupled plasma mass spectrometry, 17:31300 (R;US)
Low enrichment fuel conversion for Iowa State University: Progress report, August 1, 1991–July 31, 1992, 17:30974 (R;US)
Probing new gauge boson couplings at hadron, 17:32185 (R;US)
Review of progress in quantitative NDE: Abstracts, 17:31404 (R;US)
Simulation of forward-backward extrusion with numerical and model material techniques, 17:31231 (R;US)
The origin or the Archean Jardine iron formation-hosted lode gold deposit. Montana, 17:32014 (R;US)

Amoco Corp., Chicago, IL (United States)
Direct coal liquefaction baseline design and system analysis: Quarterly report, October–December 1991, 17:30442 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, April–June 1991, 17:30443 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, January–March 1991, 17:30444 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, September–December 1990, 17:30445 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, May–August 1990, 17:30446 (R;US)
[Direct coal liquefaction baseline design and system analysis]: Quarterly status report, [December 23, 1991–March 15, 1992], 17:30441 (R;US)

AN SSSR, Leningrad (Russian Federation). Inst. Yadernoj Fiziki
Influence of neutron spin orientation on Laue diffraction in a noncentrosymmetric crystal, 17:32380 (R;SU;In Russian)
Production of the mirror foil for the ultracold neutron guides, 17:32351 (R;SU;In Russian)

AN Ukrainskoj SSR, Kiev (Ukraine). Inst. Yadernykh Issledovanij
Measurement of the cross section of the ^{36}Ar(n,α)^{33}S and ^{50}V(n,p)^{50}Ti reactions induced by thermal neutrons, 17:32333 (R;SU;In Russian)
The disbalance of microelements in the blood of irradiated animals and its normalization with ceruloplasmin, 17:31983 (R;UA;In Russian)
The disturbance of micro element exchange in different blood of animals irradiated by different radiation sources, 17:31984 (RA;UA;In Russian)
The role of ceruloplasmin in rise of resistance modes of organism to different radiation, 17:31985 (RA;UA;In Russian)

Argonne National Lab., IL (United States)
A pocketful of tin isomers from heavy-ion collisions, 17:32272 (R;US)
A quantitative method to detect explosives and other selected semivolatiles in soil samples by Fourier transform infrared spectroscopy, 17:31686 (R;US)
A short-orbit spectrometer for Hall C, 17:31471 (R;US)
A study of the vacancy loop formation probability in Ni-Cu and Ag-Pd alloys, 17:31202 (R;US)
ABAREX: A neutron spherical optical-statistical model code, 17:32271 (R;US)
Activation energy and critical current density in Bi-Sr-Ca-Cu-O, 17:31247 (R;US)
Alternating-phase focusing: A model to study nonlinear dynamics, 17:31445 (R;US)
An engineering upgrade of the CWDD injector, 17:31472 (R;US)
ANL's research and development of alternative components for MCFC's, 17:31078 (R;US)
Applied research and development private sector accomplishments: FY90 contracts, 17:31061 (R;US)
Background modelling in Rietveld analysis, 17:31288 (R;US)
Characterization of ^{3}He area sensitive proportional counters at IPNS for SANS applications, 17:31539 (R;US)
Characterization of selected countries, 17:30555 (RA;US)
Comparative analyses of potential markets, 17:30556 (RA;US)
Constitutional and legal implications of arms control verification technologies, 17:31195 (R;US)
Control of mercury emissions from coal-fired boilers, 17:30475 (R;US)
CURIE: Fission product inventory decay history, 17:32537 (CM;US)
Development and verification of an anisotropic turbulence model in the COMMIX-1C/ATM computer code, 17:32363 (R;US)
Electromagnetic excitation of nucleon resonances, 17:32151 (R;US)
Emittance, brilliance, and bandpass issues related to an inclined crystal monochromator, 17:31614 (R;US)
Evidence for alpha-particle chain configurations in ^{24}Mg, 17:32212 (R;US)
Evolution of the scientific paper, 17:32571 (R;US)
Experimental studies of cascade phenomena in metals, 17:31203 (R;US)
Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)
Gamma spectroscopy of multiple nucleon transfer reactions in Sn, 17:32240 (R;US)
Guide to computer protection at ANL: Revision 1, 17:32505 (R;US)
High-temperature deformation and diffusion in oxides, 17:31245 (R;US)
Identification of likely market niches, 17:30558 (RA;US)
Implications for the US Department of Energy's Clean Coal Technology Demonstration Program, 17:30559 (RA;US)
Increasing the end user's productivity through seamless integration of applications with the database, 17:32572 (R;US)
Influence of dilute impurities on the evolution of defect cascades in nickel, 17:31201 (R;US)
Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code, 17:30910 (R;US)
Landau level quantization and superconductivity, 17:32381 (R;US)
LAPACK Working Note 9: A test matrix generation suite, 17:32504 (R;US)
Measurements of Al(NO$_3$)$_3$ activities in aqueous nitrate solutions, 17:31310 (R;US)

Meeting future exhaust emissions standards using natural gas as a vehicle fuel: Lessons learned from the natural gas vehicle challenge '92, 17:31189 (R;US)
Memory access in shared virtual memory, 17:32502 (R;US)
Method and apparatus for transporting liquid slurries, 17:30536 (PA;US)
Miniature neutron sources: Thermal neutron sources and their users in the academic field, 17:30781 (R;US)
Molten aluminum alloy fuel fragmentation experiments, 17:30997 (R;US)
Molten salt/metal extractions for recovery of transuranic elements, 17:30654 (R;US)
Non-isotropic thermal behavior of an MHTGR fuel block: Impact upon reactivity feedback, 17:30901 (R;US)
Oxygen diffusion in high-T_c superconductors, 17:31246 (R;US)
Probing new gauge boson couplings at hadron, 17:32185 (R;US)
Proceedings of the tenth symposium on energy engineering sciences: Synergism of analysis, modeling, and experiment, 17:31351 (R;US)
Reformers for the production of hydrogen from methanol and alternative fuels for fuel cell powered vehicles, 17:31188 (R;US)
Report of the subgroup on the top quark, 17:32152 (R;US)
Results of advanced batter technology evaluations for electric vehicle applications, 17:31043 (R;US)
Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)
Status of the US Department of Energy's Clean Coal Technology Demonstration Program, 17:31071 (RA;US)
Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
SWEB: Scientific Workstation Evaluation Benchmark, 17:32523 (CM;US)
Technology descriptions and demonstrations, 17:30419 (RA;US)
The Argonne silicon strip-detector array, 17:31540 (R;US)
The efficient parallel iterative solution of large sparse linear systems, 17:32503 (R;US)
Thermal effects on the frequency response of piezoelectric crystals, 17:31265 (R;US)
Thermal imaging of synchrotron beams on silicon crystals, 17:31470 (R;US)
Thermodynamic analysis of phase equilibria in the iron-zirconium system, 17:31204 (R;US)
Trade-related issues and barriers, 17:30557 (RA;US)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
User's manual for the ARMLID (Argonne metallic lithium/isotopic dilution) tritium assay system, 17:32437 (R;US)
Utilization of databases to manage resources, 17:31473 (R;US)
Waste minimization in the oil and gas industries, 17:30578 (R;US)
Weak-beam imaging of dissociated dislocations in HVEM-irradiated Fe-Ni-Cr alloys, 17:31200 (R;US)
[Effects of ionizing radiation on scintillators and other particle detectors]: Conference summary, 17:31541 (R;US)

Argonne National Lab., IL (United States). Analytical Chemistry Lab.
Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)
Innovative methods for inorganic sample preparation, 17:31286 (R;US)

Argonne National Lab., IL (United States). Fusion Power Program
Modeling of tritium behavior in Li_2O, 17:32438 (R;US)

Arizona Univ., Tucson, AZ (United States)
[Elementary particle physics research]: Final report, [1 January 1991–31 January 1992], 17:32068 (R;US)

Arizona Univ., Tucson, AZ (United States). Dept. of Chemical Engineering
Mechanism of surface enrichment and adhesion of coal combustion particulates: First quarterly report, February 1987, 17:30548 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)

Arizona Univ., Tucson, AZ (United States). Dept. of Mining and Geological Engineering
Sealing performance of bentonite and bentonite/crushed rock borehole plugs, 17:30710 (R;US)

Arkansas Univ., Fayetteville, AR (United States). Coll. of Engineering
Biological conversion of synthesis gas: Project status report, January 1, 1992–March 31, 1992, 17:30436 (R;US)

Association Euratom-CEA, Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee
Anharmonicity in resonant perturbations and its effect on stochasticity extension, 17:32425 (R;FR)
Design study of a 1 MV, 4 A, D- test bed in european community, 17:32443 (R;FR)
Determination of the safety factor profile in Tore Supra from striations observed during pellet ablation, 17:32458 (R;FR)
First results on D- production in the joint CEA-JAERI experiment at Cadarache, 17:32444 (R;FR)
Lower hybrid current drive experiments in Tore Supra, 17:32422 (R;FR)
Lower hybrid wave coupling in Tore Supra through multi junction launchers, 17:32423 (R;FR)
The Beasts' model of percolative transport, 17:32424 (R;FR)
The european programme on negative ion beam development, 17:32442 (R;FR)

Association of Finnish Electric Utilities, Helsinki (Finland)
Residential electricity consumption, 17:31118 (R;FI;In Finnish)

Atlantic Richfield Hanford Co., Richland, WA (United States)
200 Areas operation monthly report, August 1968, 17:30650 (R;US)
200 Areas operation monthly report, October 1968, 17:30637 (R;US)
200 Areas operation monthly report, September 1967, 17:30635 (R;US)
200 Areas operation monthly report, October 1967, 17:30636 (R;US)

Atomic Energy Control Board, Ottawa, ON (Canada)
Occupational radiation exposure and mortality study: Internal linkage of the Canadian National Dose Registry, 17:31922 (R;CA)

Atomic Energy Establishment, Trombay (India)
APARNA2: 1-d integral neutron transport slab, 17:32531 (CM;IN)

Atomic Energy of Canada Ltd., Ottawa, ON (Canada)
The role of nuclear power plant designers, 17:30907 (IA;CA)

Atomic Energy of Canada Ltd., Pinawa, MB (Canada). Whiteshell Nuclear Research Establishment
Comments on the state of knowledge about climatic and geological processes and extra-terrestrial events, 17:31685 (RA;CA)
Introduction to transitional events workshop, 17:30652 (RA;CA)

Atomic Energy of Canada Ltd., Sheridan Park, ON (Canada). CANDU Operations
The role of nuclear power plant designers, 17:30907 (IA;CA)

Australian Inst. of Nuclear Science and Engineering, Lucas Heights (Australia)
The use of a scanning proton microprobe in AIDS research, 17:31852 (IA;AU)

Australian National Univ., Canberra (Australia). Research School of Earth Sciences
Boron isotope geochemistry in the terrestrial environment, 17:31715 (IA;IL)
Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments, 17:31706 (IA;IL)

B

Battelle Pacific Northwest Lab., Richland, WA (United States)
IRDAM: Interactive rapid dose assessment model, 17:32544 (CM;US)
SADDE-MOD1: Scaled absorbed dose distribution evaluator, 17:32542 (CM;US)
Summary of the March 25–26, 1991 atmospheric model working meeting: Hanford Environmental Dose Reconstruction Project, 17:31999 (R;US)

- VARSKIN: Dose calculation of contamination of the skin, 17:32543 (CM;US)

Battelle, Columbus, OH (United States)

- VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

BDM Engineering Services Co., Morgantown, WV (United States)

- Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)

Bechtel Corp., San Francisco, CA (United States)

- Confined zone dispersion flue gas desulfurization demonstration: Volume 1, Quarterly report No. 4, August 1, 1991–October 31, 1991, 17:30484 (R;US)

Bechtel National, Inc., Oak Ridge, TN (United States)

- Data Base Management Plan for the remedial investigation of Waste Area Grouping 5 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:32576 (R;US)

Bechtel, Inc., Houston, TX (United States)

- Direct coal liquefaction baseline design and system analysis: Quarterly report, October–December 1991, 17:30442 (R;US)
- Direct coal liquefaction baseline design and system analysis: Quarterly report, April–June 1991, 17:30443 (R;US)
- Direct coal liquefaction baseline design and system analysis: Quarterly report, January–March 1991, 17:30444 (R;US)
- Direct coal liquefaction baseline design and system analysis: Quarterly report, September–December 1990, 17:30445 (R;US)
- Direct coal liquefaction baseline design and system analysis: Quarterly report, May–August 1990, 17:30446 (R;US)
- [Direct coal liquefaction baseline design and system analysis]: Quarterly status report, [December 23, 1991–March 15, 1992], 17:30441 (R;US)

Ben-Gurion Univ. of the Negev, Beersheba (Israel)

- Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee, 17:31712 (IA;IL)

Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering

- Rn gas level as an indicator to the radiological impact of Rn progeny, 17:31650 (IA;IL)

Bergen Univ. (Norway)

- Analysis of three-component seismic data with emphasis on anisotropy, 17:30564 (I;NO)

Blackhawk Geosciences, Inc., Golden, CO (United States)

- Characterization of reservoir rocks and fluids by surface electromagnetic transient methods: Annual report, January 1991–January 1992, 17:30561 (R;US)

Boston Univ., MA (United States). School of Medicine

- Applications of micellar enzymology to clean coal technology: Tenth quarterly report, 17:30438 (R;US)

Bovay Northwest, Inc., Richland, WA (United States)

- Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)

Brigham Young Univ., Provo, UT (United States)

- Application of integrated codes, 17:30434 (RA;US)
- Comprehensive model development and evaluation, 17:30433 (RA;US)
- Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport: Quarterly technical progress report, March 15, 1992–June 14, 1992, 17:30550 (R;US)
- Structure of a near-laminar coal jet flame, 17:30542 (RA;US)
- Submodel development and evaluation, 17:30432 (RA;US)

Brookhaven National Lab., Upton, NY (United States)

- Active damping of Maglev vehicles using superconducting linear synchronous motors, 17:31176 (RA;US)
- An improved numerical model for the investigation of thermal hydraulic phenomena with applications to LMR reactor components, 17:30911 (R;US)
- An integrated approach to develop conductors, coils, cryogenic system, on-board magnet assembly, 17:31178 (RA;US)
- Analysis of PIUS reactor passive shutdown using PC-based model, 17:31003 (R;US)
- Assessment of prism responses to loss of flow events, 17:31004 (R;US)
- Asymmetric flow events in a VEER 1000, 17:30998 (R;US)
- Bunched beam stochastic cooling, 17:31446 (R;US)
- Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems, 17:31059 (R;US)
- Cryogenic refrigeration for Maglev requirements and opportunities, 17:31172 (RA;US)
- Design of advanced stray field shielding for Maglev, 17:31164 (RA;US)
- Development of (1) cable in conduit conductors and of (2) an approach to FMECA for Maglev magnet systems, 17:31170 (RA;US)
- Developments in geothermal waste treatment biotechnology, 17:30853 (R;US)
- Emerging Maglev research needs, 17:31166 (RA;US)
- Federal Maglev program, 17:31162 (RA;US)
- Frequency spectrum generated by AGS Booster power swing, heavy ion cycle, 17:31481 (R;US)
- Frustrated phase separation and high temperature superconductivity, 17:31248 (R;US)
- He II and Maglev - Is there a role?, 17:31173 (RA;US)
- High efficiency propulsion and levitation systems, 17:31175 (RA;US)
- Institutional obstacles to the development of Maglev in the United States, 17:31184 (RA;US)
- Intermetallic superconductors - The state of development in 1991, 17:32382 (RA;US)
- International Maglev technology center, 17:31163 (RA;US)
- Light weight, high field, stable, superconducting magnets for advanced transportation systems, 17:31171 (RA;US)
- Longitudinal impedance of capacitive pick-up electrodes: Calculations and comparison with measurements, 17:31474 (R;US)
- Maglev system concept using 20-K high-temperature superconductors, 17:31165 (RA;US)
- Magnet research required for Maglev, 17:31169 (RA;US)
- Magnetic shielding in Maglev, 17:31167 (RA;US)
- Need for the detection of guideway misalignment and foreign objects, 17:31181 (RA;US)
- New York State Maglev related programs, 17:31161 (RA;US)
- Operational status of the AGS Booster Main Ring Magnet Power Supply, 17:31477 (R;US)
- Organizational culture during the accident response process, 17:31000 (R;US)
- Outage management: A case study, 17:31001 (R;US)
- Parametric studies of suspension and propulsion subsystems in a Maglev transportation system, 17:31179 (RA;US)
- Preliminary study of AC power feeders for AGS booster, 17:31479 (R;US)
- R and D needs and opportunities for application of space vehicle cryogenic technology to Maglev systems, 17:31174 (RA;US)
- Radiation damage in cesium iodide and other scintillating crystals, 17:31542 (R;US)
- Rf beam loading in the Brookhaven AGS with booster injection, 17:31478 (R;US)
- RHIC status, 17:31427 (R;US)
- Rotationally resolved photoionization with coherent VUV radiation, 17:32360 (R;US)
- Safety aspects of forced flow cooldown transients in modular high temperature gas-cooled reactors, 17:31002 (R;US)
- Safety factors on Maglev systems, 17:31182 (RA;US)
- Scaling of gain with energy spread and energy in the PEP FEL, 17:31529 (R;US)
- Simulation of high level neutron coincidence counter, 17:30765 (R;US)
- Simulation of Maglev ride environment, 17:31168 (RA;US)
- Single failure effects on surge line break transients for the VVER-440 reactor, 17:30999 (R;US)
- Spectrum analysis of the power line flicker induced by the electrical test of the prototype Booster dipole, 17:31480 (R;US)
- Sustained passenger G-loads in Maglev: Needs and payoffs, 17:31183 (RA;US)
- The BNL Accelerator Test Facility and experimental program, 17:31429 (R;US)
- The Brookhaven National Laboratory Accelerator Test Facility, 17:31428 (R;US)
- The IAEA system and experience as a model for Information Management under the Chemical Weapons Convention, 17:31196 (R;US)

The impact of right-of-way geometry on ride quality, 17:31180 (RA;US)
The K$^+$ as a probe of nuclear medium effects, 17:32273 (R;US)
The operational status of the Booster injector for the AGS accelerator complex at BNL, 17:31476 (R;US)
The partial beam lifetime at RHIC due to Coulomb dissociation of the nucleus, 17:31448 (R;US)
The potential effects of concurrent increases in temperature, CO$_2$ and O$_3$ on net photosynthesis, as mediated by rubisCO, 17:31687 (R;US)
The RF beam control system for the Brookhaven AGS synchrotron, 17:31475 (R;US)
Threshold Maglev research and development program - A no regrets approach to Maglev R and D, 17:31185 (RA;US)
Topics on RF beam control of a synchrotron, 17:31449 (R;US)
Tune spread due to magnetic multipoles in RHIC, 17:31447 (R;US)
Two-nucleon production of hyperons in an S = −1 dibaryon search, 17:32274 (R;US)
Use of AC suspension magnets for Maglev propulsion and levitation, 17:31177 (RA;US)

Brown Univ., Providence, RI (United States)
[High temperature fatigue crack growth in ceramics and ceramic composites]: [Annual report, August 1991–July 1992], 17:31255 (R;US)

Brown Univ., Providence, RI (United States). Div. of Engineering
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
Characterization of porosity via secondary reactions: Quarterly technical progress report, 15 December 1991–15 March 1992, 17:30473 (R;US)

Bundesamt fuer Strahlenschutz, Salzgitter (Germany)
Project: Radiological assessment of the southern region of East Germany. Natural radioactivity. Long-standing land pollution from mining activities. Radon activity. Management of long-standing land pollution. Database establishment. Radiological assessment. Participation and information of the public, 17:31658 (I;DE;In German)

Bundesministerium fuer Forschung und Technologie, Bonn (Germany)
Application of the Rutherford backscattering analysis (RBS analysis) for detecting heavy impurity elements in pBN crucible materials. Final report, 17:31298 (I;DE;In German)
Investigations concerning the exchange of iodine from non-volatile organic iodine compounds. Final report, 17:30641 (I;DE;In German)
Status report on geochemical modelling, 17:30700 (R;DE)
The nuclear reaction analysis (NRA) as a means for detecting carbon in GaAs and in source materials and additives. Final report, 17:31299 (I;DE;In German)

C

California Univ., Berkeley, CA (United States). Electronics Research Lab.
Self-generated stochastic heating in an rf discharge: Annual progress report, May 15, 1991–May 14, 1992, 17:32410 (R;US)

California Univ., Los Angeles, CA (United States). Dept. of Physics
Application of computer modeling to fusion research: Progress report, November 1, 1991–October 31, 1992, 17:32416 (R;US)

California Univ., San Diego, La Jolla, CA (United States)
[Studies of ocean predictability at decade to century time scales using a global ocean general circulation model in a parallel competing environment]: Progress report, 17:32515 (R;US)

Canadian Fusion Fuels Technology Project, Toronto, ON (Canada)
Canadian ceramic breeder sphere-pac technology: Capability and recent results, 17:32445 (R;CA)

Canadian Nuclear Association, Toronto, ON (Canada)
A comparison of methods for monitoring miner exposure to radon decay products, 17:31953 (IA;CA)
A dynamic approach to the implementation of the optimizatio principle in uranium mines, 17:30611 (IA;CA)
A flexible computer model for radon daughter exposure health risk assessment, 17:31938 (IA;CA)
A passive integrating radon dosimeter combining activated char coal and TLD, 17:31563 (IA;CA)
A review of all sources of exposure to natural radiation in UK mines, 17:31719 (IA;CA)
A study of the dose conversion factors for inhalation risk assessmen from radon daughters in mine atmospheres, 17:30618 (IA;CA)
Abstracts of the International Conference on Occupational Radiation Safety in Mining, 17:30608 (I;CA)
Activated carbon filter paper method for the measurement of radon and thoron concentration, 17:31564 (IA;CA)
Actual state of the epidemiological study of uranium miners in France, 17:31935 (IA;CA)
Aerodynamic parameter determination in inlet orifice of CEA personal alpha dosimeter, 17:31553 (IA;CA)
Are the current dose limits for uranium mines too high?, 17:30619 (IA;CA)
Automatic discrimination and read-out of tracks of RaA and RaC, on CR39 using image analysis, 17:31562 (IA;CA)
Calibration of the airborne radon daughter monitor, 17:31554 (IA;CA)
Canadian and U.S. approaches to occupational health regulations, 17:30780 (IA;CA)
Characterization of radioactive long-lived dust present in uranium mines and mills atmospheres, 17:30624 (IA;CA)
Comparative tests of radon and radon daughter detection systems under simulated environmental conditions, 17:31552 (IA;CA)
Comparing personal alpha dosimetry with the conventional area monitoring-time weighting methods of exposure estimation, 17:31946 (IA;CA)
Computer modeling of airborne alpha radiation in mines, 17:31655 (IA;CA)
Computer modeling of radon transport into underground openings, 17:31723 (IA;CA)
Concentrations of ^{210}Pb in uranium miners' lungs and its state of equilibria with ^{238}U, ^{234}U, and ^{230}Th, 17:31949 (IA;CA)
Control of radiation hazards in uranium exploration, 17:30612 (IA;CA)
Derived surface contamination limits for the uranium mining and milling industry, 17:30627 (IA;CA)
Design for beta radiation protection in the mining and milling of high grade uranium ore, 17:30630 (IA;CA)
Development of a joint labour-management safety inspection system at Denison operations, 17:30632 (IA;CA)
Differences in 'in vitro' dissolution properties of settled and airborne uranium material, 17:31720 (IA;CA)
Electrical properties of radon daughters, 17:31656 (IA;CA)
EROS: Electronic radon observation system, 17:31560 (IA;CA)
Evaluation of a microcomputer system for controlling and monitoring radiation hazards in uranium mines, 17:30631 (IA;CA)
Evaluation of radiological hazards associated with mineral sand-mining, 17:31955 (IA;CA)
Experimental verification of the theory of clusters, 17:31947 (IA;CA)
Impact of occupational hazards on the life expectancy of uranium miners, 17:31940 (IA;CA)
In-mine evaluation of continuous radon and working level detectors, 17:31555 (IA;CA)
Incidence and development of lung cancer due to cigarette smoking and radiation exposure in uranium miners, 17:31942 (IA;CA)
Inherent dosimetric and epidemiological uncertainties associated with lung cancer risk assessment for mining populations, 17:31933 (IA;CA)
Local static method for measuring radon emanation rate from porous materials, 17:31718 (IA;CA)
Long term measurements of WL-levels in metal mines by using the ASS-system and HCS-system, 17:31651 (IA;CA)
Lung cancer induction in rats by radon daughter exposure: Status as of 1984 on low doses effects, 17:31931 (IA;CA)
Lung cancer mortality and radiation exposure among the Newfoundland fluorspar miners, 17:31937 (IA;CA)

Measurement of temporal variations in radon progeny working levels in mine atmospheres, 17:30617 (IA;CA)

Measurements of radon and decay products in non-uranium mines of the Federal Republic of Germany using active and passive methods, 17:31654 (IA;CA)

Mine tests of a passive electret dosimeter for radon/thoron daughters, 17:31561 (IA;CA)

Monitoring of radiation exposure from different natural sources in Polish coal mines, 17:31722 (IA;CA)

Mortality experience among workers in the uranium industry, 17:31936 (IA;CA)

New capabilities for measurement of natural radioactivity using high purity N-type germanium detectors, 17:31565 (IA;CA)

Non-steady state radiation mine models: Practical applications to personal dosimetry and environmental monitoring, 17:30629 (IA;CA)

Pb-210 concentrations in the blood of ground workers and underground miners of zinc-lead mine, 17:31950 (IA;CA)

Physical and environmental surveillance in uranium exploration galleries, 17:30626 (IA;CA)

Pilot ALARA analysis applied to dose reduction in an underground uranium mine, 17:30609 (IA;CA)

Practical approach to retrospective estimation of radon daughter concentration in the underground mining environment, 17:30623 (IA;CA)

Problems in setting and applying limits for occupational exposure to radon daughters, 17:30621 (IA;CA)

Radiation monitoring program in Italian non-uranium mines, 17:31653 (IA;CA)

Radiation protection at a high grade uranium mine, 17:30613 (IA;CA)

Radiation safety aspects of occupational areas at a Brazilian open-pit mine, 17:30610 (IA;CA)

Radon and radon daughter concentrations over an extended uranium ore body, 17:30614 (IA;CA)

Radon and radon daughter products: Their chemistry after alpha-decay, 17:31334 (IA;CA)

Radon concentrations in air of Polish underground coal mines, 17:31652 (IA;CA)

Radon emanation at the Muellenbach research uranium mine and its effects on ventilation planning, 17:30625 (IA;CA)

Radon transport into underground openings, 17:31721 (IA;CA)

Randomization of grab sampling strategies for estimating the exposure of uranium miners to radon daughters, 17:30615 (IA;CA)

Recreating and measuring the underground environment of the late 1950's, 17:31717 (IA;CA)

Removal or airborne thoron (radon) daughters on mine walls and other surfaces by convective deposition and electrostatic plate-out, 17:30622 (IA;CA)

Research and development of equipments of radon daughters in underground mines, 17:30628 (IA;CA)

Review of gamma and radon daughter exposures of uranium mine workers in 1982 and 1983 in terms of the present and proposed amendments to the AEC regulations, 17:31952 (IA;CA)

Sex ratio of first-born children of United States uranium miners, 17:31943 (IA;CA)

Studies of Grants, New Mexico, uranium miners, 17:31939 (IA;CA)

The consequences of the latest ICRP recommendations on a revision of Publication 24, 17:30620 (IA;CA)

The development and field testing of the thermoluminescent personal dosimeter for measuring exposure to radon and thoron daughters, 17:31557 (IA;CA)

The development of track etch dosimeters for measuring radon daughter exposures, 17:31556 (IA;CA)

The development, introduction and early operating experience of a large scale external gamma monitoring program in Canadian uranium mines, 17:30616 (IA;CA)

The dynamic theory of clusters, 17:31944 (IA;CA)

The establishment of a national calibration centre for practical standards for bioassay and in vivo monitoring, 17:31954 (IA;CA)

The Ontario miners mortality study 1955-1977: Progress report, 17:31934 (IA;CA)

The Pylon 190: A novel filter calibration standard for alpha spectrometry, 17:31558 (IA;CA)

The transient response of radon and thoron chambers, 17:31559 (IA;CA)

The United States uranium registry tissue program: An update, 17:31932 (IA;CA)

Thermophoretic collection of radon daughters with potential application to personal dosimetry, 17:31948 (IA;CA)

Thoron daughter to radon daughter ratios in mines, 17:31657 (IA;CA)

Update of the United States Public Health Service uranium miners cohort study, 17:31941 (IA;CA)

Uranium bearing particles in miners' and millers' lungs, 17:31951 (IA;CA)

Uranium measurements in urine: A summary of the operating experience at Canadian uranium mills, 17:31945 (IA;CA)

Carnegie-Mellon Univ., Pittsburgh, PA (United States)

Experimental Medium Energy Physics: Annual progress report, June 1991–May 1992, 17:32067 (R;US)

Case Western Reserve Univ., Cleveland, OH (United States). Dept. of Chemical Engineering

Operating characteristics of rotating beds: Technical progress report for the third quarter 1988, 17:31297 (R;US)

CEA Centre d'Etudes de Bruyeres-le-Chatel, 91 (France)

Study of the extraction and the purification of americium and trivalent actinides contained in effluents with supported liquid membranes, 17:31333 (R;FR;In French)

Technology and component development for a closed tritium cycle, 17:32440 (R;FR)

The finite temperature QED vacuum, within the mean field approximation, 17:32129 (R;FR;In French)

CEA Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France)

Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes, 17:30699 (R;FR;In French)

CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France)

Development of time-resolved laser fluorescence spectrometry for on-line uranium checking in solutions of the Purex reprocessing process, 17:30640 (R;FR;In French)

CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire

An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)

CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Recherche Fondamentale sur la Matiere Condensee

Probing atomic-size defects and free volumes with positron and positronium, 17:32370 (R;FR)

CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Thermohydraulique et de Physique

Low temperature sintering of hyperstoichiometric uranium dioxide, 17:30633 (R;FR;In French)

CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Sciences de la Matiere

A recovery study of electron irradiated Al-Li alloys, 17:32369 (R;FR)

Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)

CEA Centre d'Etudes de Grenoble, 38 (France). Direction des Technologies Avancees

Intelligent perception control based on a blackboard architecture, 17:31347 (R;FR)

Interest of TOF PET for clinical applications, 17:31771 (R;FR)

Measure of water transfers by diffusion and permeation through materials, 17:30656 (R;FR)

Optical properties of Er^{3+} and Tm^{3+} doped Y_2SiO_5, 17:31250 (R;FR)

Oxygen concentration measurements using the ESR line modification of PcLi molecules, 17:31289 (R;FR)

The mass transfers of water by diffusion and permeation through a covering of wastes disposal, 17:30655 (R;FR)

Use of a model for 3D image reconstruction, 17:31770 (R;FR;In French)

YBCO based multilayers for optoelectronic devices, 17:31251 (R;FR)

CEA Centre d'Etudes de la Vallee du Rhone, 30 - Marcoule (France). Dept. des Procedes de Retraitement

Extraction of molybdenum by the di-n-butyl 2.2.N.hydroxyhexanamide (tri-n-butylacetohydroxamic acid) from aqueous acidic media, 17:31290 (R;FR;In French)

CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)

Experimental program on the 20 TW laser system, 17:32394 (R;FR)
ICF related experiments at CEL-V, 17:32439 (R;FR)

CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Mecanique et de Technologie

LIPSIE experiment: Pb17Li irradiation in water loop with on line tritium measurements, 17:32441 (R;FR)
Preliminary interpretation of the Libretto-2 experimental results in terms of tritium permeation barrier efficiency, 17:30657 (R;FR)
Study of zirconium/stainless steel interface in tubular junctions made by eutectic diffusion, 17:31205 (R;FR)

CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux

9Cr-1Mo martensitic alloys: effects of the nitrogen, niobium and vanadium additions on the microstructure, phase transformations and mechanical properties, 17:31211 (R;FR;In French)
A new method for residual stress distribution - analysis of corroded zircaloy-4 cladding, 17:31208 (R;FR)
Effect of a sustained load and a low loading rate on 16 MND5 steel ductile tearing resistance, 17:31207 (R;FR;In French)
Electrical and microstructural characterization of silver sheathed high T_c superconductors wires and ribbons, 17:31249 (R;FR)
The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria, 17:31210 (R;FR;In French)

CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. des Applications et de la Metrologie des Rayonnements Ionisants

Intercomparison of plutonium isotopic composition measurements by X-and gamma-ray spectrometry; results from the Pidie exercise, final report, 17:31291 (R;FR;In English, French)

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection Sanitaire

Targeting of macrophages for the scintigraphic evaluation of inflammatory lesions in a model of radio-induced inflammation in pigs, 17:31769 (R;FR)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Physique des Particules Elementaires

Monte Carlo simulations in theoretical physic, 17:32018 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Sciences de la Matiere

Nuclear physics in a swelled world, 17:32203 (R;FR)
Quantum fields at finite temperature and density, 17:32070 (R;FR)
The modification of hadrons propagating in dense media, 17:32186 (R;FR)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Direction des Technologies Avancees

Determination of a crystalline orientation distribution function based on inverted poles figures principle for hexagonal crystalline symmetry. Macroscopic physical properties prediction, 17:31206 (R;FR;In French)
Development of a local approach for the intergranular fracture in low alloy steels, 17:31209 (R;FR)
Path tracking control of mobile robots with techniques based on the use of curved abscissa, 17:31348 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service de Physique Theorique

Moment problem formulation of the Schroedinger equation, 17:32019 (R;FR)

CEA-Ecole Polytechnique, 91 - Palaiseau (France). Lab. d'Etudes des Solides Irradies

Electronic excitations in metallic systems: from defect annihilation to track formation, 17:32375 (R;FR)

CER Corp., Las Vegas, NV (United States)

Multiwell Experiment final report: 4, The fluvial interval of the Mesaverde Formation, 17:30586 (R;US)

Ceskoslovenska Akademie Ved, Prague (Czechoslovakia). Fyzikalni Ustav

12th general conference of the condensed matter division of the E.P.S. V.16A., 17:32372 (I;CS)
Neutron diffraction study of $Sr_xBa_{1-x}Nb_2O_6$ crystals, 17:32373 (IA;CS)

Ceskoslovenska Komise pro Atomovou Energii, Prague (Czechoslovakia)

Report on the activities of the Czechoslovak Atomic Energy Commission in performing its function of State Surveillance over Nuclear Safety of Nuclear Facilities in 1991, 17:30892 (I;CS;In Czech)

Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Electical Machines and Power Electronics

Investigation of an electrical converter system with an induction generator for variable speed operation of a wind turbine, 17:30860 (R;SE)

Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics

Nonlinear shaping of a two-dimensional ultrashort ionizing pulse, 17:32409 (R;SE)
Plasma temperature and density dynamics including particle and heat pinch effects, 17:32408 (R;SE)
Vortices in nonuniform upper-hybrid field, 17:32406 (R;SE)
Vortices with a nonuniform group velocity, 17:32407 (R;SE)

Chalmers Univ. of Technology, Goeteborg (Sweden). School of Electrical Engineering

Linear quadratic control of variable speed wind turbines below rated power, 17:30859 (R;SE)

Chem Systems, Inc., Tarrytown, NY (United States)

Liquid Phase Methanol LaPorte PDU: Modification, operation, and support studies: Quarterly technical progress report No. 4, 1 April–30 June 1988, 17:30452 (R;US)

Chicago Univ., IL (United States)

In vivo metabolism of I-123 labeled semisynthetic low density lipoproteins: Final technical report, September 28, 1988–September 27, 1990, 17:31776 (R;US)

Chicago Univ., IL (United States). Enrico Fermi Inst.

Participation in multilateral effort to develop high performance integrated CPC evacuated collectors: Final report, July 1, 1986–May 31, 1987, 17:30828 (R;US)

Children's Hospital of Philadelphia, PA (United States)

Proceedings of the second international chromosome 22 workshop, 17:31767 (R;US)

China Nuclear Information Centre, Beijing, BJ (China)

α-sealed transfer device and portable plastic film sealers, 17:31349 (R;CN;In Chinese)
A method of using γ-ray spectrum of ^{40}K to detect firecrackers, 17:30785 (R;CN;In Chinese)
A new corrosion testing facility with heat flux caused surface boiling conditions, 17:31212 (R;CN;In Chinese)
A nondestructive testing device for determining ^{235}U enrichment in power reactor fuel elements, 17:30951 (R;CN;In Chinese)
A probabilistic safety assessment of in-pile test loop in HWRR, 17:30867 (R;CN)
A revolving irradiation stage, 17:31350 (R;CN;In Chinese)
A search for neutrinoless double beta decay of ^{48}Ca, 17:32241 (R;CN;In Chinese)
A study on ^{90}Sr adsorption by the soils around Qinshan and Daya Bay nuclear power plants, 17:31690 (R;CN;In Chinese)
A whole reactor model hydraulic test for Qinshan nuclear power plant, 17:30884 (R;CN;In Chinese)
An elevator for cobalt-60 source, 17:30784 (R;CN;In Chinese)
An experimental investigation on turbulent flow through symmetric wall-subchannels of rod bundles, 17:31378 (R;CN;In Chinese)
An experimental study of bubble detachment point in subcooled boiling at low pressure and velocity, 17:31381 (R;CN;In Chinese)
Analysis and evaluation of the in-pile irradiation test of the fuel element for Qinshan Nuclear Power Plant, 17:30882 (R;CN;In Chinese)
Analysis of cracks and fractography on steam generator tubes, 17:30890 (R;CN;In Chinese)

China Nuclear Information Centre, Beijing, BJ (China)

Autoradiographic visualization on the role of central ^{3}H-5-hydroxytryptamine in acupuncture analgesia, 17:31854 (R;CN;In Chinese, English)

Characteristic of the flux pinning at intergrain boundaries in bulk Bi-Pb-Sr-Ca-Cu-O superconductors, 17:32385 (R;CN)

Characteristics of low-q discharge on HT-6B tokamak, 17:32399 (R;CN;In Chinese)

Communication of nuclear data progress: No.4(1990), 17:32204 (R;CN)

Comprehensive research on sealing behaviour of reactor vessel of 300 MWe nuclear power plant, 17:30880 (R;CN;In Chinese)

Conceptual design of fixed bed burning system: A study of the head-end process for Th-U nuclear fuel cycle in HTGR, 17:30639 (R;CN;In Chinese)

Data acquisition and processing system for coincidence measurements, 17:31545 (R;CN;In Chinese)

Determination of plutonium in environmental water, 17:31292 (R;CN;In Chinese)

Development and research of in-core transducers at IAE (Institute of Atomic Energy), 17:31606 (R;CN;In Chinese)

Development for specific heat measuring apparatus of high T_c superconductor in $80 \approx 200$ K temperature range, 17:32383 (R;CN;In Chinese)

Development of ^{60}Co after-loading source, 17:30786 (R;CN;In Chinese)

Development of a ^{60}Co radioactive rod source used for γ-ray level gauge, 17:30787 (R;CN;In Chinese)

Development of radiation preservation technique in Beijing, 17:31856 (R;CN)

Distribution of natural uranium in Jiuquan ecological environment, 17:31689 (R;CN;In Chinese)

Economic benefits of increased discharge burnup for PWR: Prospect of increasing discharge burnup for Daya Bay NPP and Qinshan NPP1, 17:30924 (R;CN)

Effect of ^{60}Co radiation on the fibrinolysis and anticoagulation of endothelial cells, 17:31868 (R;CN;In Chinese)

Effects of ^{60}Co γ-ray irradiation on human platelets, 17:31871 (R;CN;In Chinese)

Effects of irradiation on normal human lymphocytes, 17:31872 (R;CN;In Chinese)

Environmental and agricultural impacts of the Chernobyl NPP accident on the countries of the northern hemisphere, 17:31867 (R;CN;In Chinese)

Excitation adjustable system of toroidal field waveform for tokamak HL-1, 17:32397 (R;CN;In Chinese)

Expansive-graphite-sandwiched spiral-wound stainless steel gasket applied to manhole sealing joints of nuclear equipment, 17:31267 (R;CN;In Chinese)

Experimental research on flow resistance in piping components under natural circulation condition, 17:31379 (R;CN;In Chinese)

Experimental study on critical heat flux with long rod bundle, 17:30886 (R;CN;In Chinese)

Flux creep in fluorine-doping Bi-Pb-Sr-Ca-Cu-O bulk superconductor, 17:32384 (R;CN;In Chinese)

Hard X-ray measurement on HT-6B tokamak, 17:32400 (R;CN;In Chinese)

Improved thomas formula for radon measurement, 17:31644 (R;CN;In Chinese)

Improving the properties of stainless steel electron-beam welds by laser treatment, 17:31213 (R;CN;In Chinese)

Investigation of the neutron diffraction anomaly and electrical behaviour of α-LiIO$_3$ single crystal under AC field, 17:31266 (R;CN;In Chinese)

Investigation on subcold boiling-induced hydrodynamic instability in a natural circulation system, 17:31380 (R;CN;In Chinese)

Irradiation surveillant test of High Flux Engineering Test Reactor (HFETR) pressure vessel, 17:30972 (R;CN;In Chinese)

Irradiation test of borosilicate glass burnable poison, 17:30889 (R;CN;In Chinese)

Leaching process of nuclear fuel in leaching solution at sub-boiling temperature, 17:30638 (R;CN;In Chinese)

Level 1 probabilistic safety assessment on swimming pool reactor at IAE, 17:30971 (R;CN)

Machining technology for spider of control assembly, 17:30954 (R;CN;In Chinese)

Macro-and micro-autoradiographic study in comparison with the incorporation of ^{35}S-methionine by various tissue protein in organism, 17:31857 (R;CN;In Chinese)

Manufacturing technology of top nozzle and bottom nozzle in fuel assembly for nuclear power plant, 17:30883 (R;CN;In Chinese)

Model SM-1 ballast density gauge, 17:30783 (R;CN;In Chinese)

Modulate function and effect of ^{60}Co γ-rays on ConA-induced CD_4^+ and CD_8^+ subpopulations of lymphocytes, 17:31874 (R;CN;In Chinese)

Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments, 17:31877 (R;CN;In Chinese)

Neutron irradiation test of the S271 steel, 17:31214 (R;CN;In Chinese)

Nondestructive testing of bonding of low enriched uranium elements by using ultrasonic phase-amplitude technique, 17:30952 (R;CN)

Nuclear safety legislation and supervision in China, 17:30918 (R;CN)

Numerical research of multiple integral, 17:32508 (R;CN;In Chinese)

Numerical simulation for HT-6M tokamak electrical transient behaviours, 17:32447 (R;CN)

Observation of spatial resolution of ECR plasma on the MM-2 magnetic mirror, 17:32401 (R;CN;In Chinese)

One and three dimensional numerical simulation of millimeter wave fel amplifiers with rectangular waveguide, 17:31483 (R;CN;In Chinese)

Placental and milk transfer as well as distribution of ^{147}Pm in mouse, 17:31870 (R;CN;In Chinese)

Preparation of rT$_3$ in human serum ria kit, 17:31329 (R;CN;In Chinese)

Preparation of uranium dioxide powder: Process for production coarse particle ADU precipitate in pilot plant, 17:30634 (R;CN;In Chinese)

Preparation of Y-Ba-Cu-O superconducting film above liquid nitrogen temperature, 17:32386 (R;CN;In Chinese)

Radiation monitor system for nuclear power plants, 17:30955 (R;CN;In Chinese)

Radioimmunoassay for platelet activation specific protein GMP-140 on the platelet surface and in plasma, 17:31858 (R;CN;In Chinese)

Radiological environmental quality assessment of the nuclear industry in China over the past 30 years, 17:30964 (R;CN;In Chinese)

Relativistic cloud-in-cell simulation of free-electron laser (FEL) with considering space charge effects, 17:31482 (R;CN;In Chinese)

Skyrmions of different types, 17:32130 (R;CN;In Chinese)

Space nonweaponization. An urgent task for arms control, 17:31191 (R;CN;In Chinese)

Spatial filtring and thermocouple spatial filter, 17:31605 (R;CN;In Chinese)

Study of electron-beam-pumped KrF laser kinetics and calculation of energy deposition, 17:32048 (R;CN;In Chinese)

Study on the ^{90}Sr absorption by agricultural plants grown in soil from Daya Bay and Qinshan area, 17:31875 (R;CN;In Chinese)

Study on the dose models of ^{147}Pm in tissues of mouse, 17:31869 (R;CN;In Chinese)

Study on the early and late mutants of radiation induced rice, 17:31855 (R;CN;In Chinese)

Study on the focal-plane detector system for medium heavy ions, 17:31546 (R;CN;In Chinese)

Study on the retention of enriched UO$_2$F$_2$ in the mouse and its radiogenotoxicological effects, 17:31876 (R;CN;In Chinese)

The anomalous transport caused by magnetic perturbation in tokamak, 17:32446 (R;CN)

The calculations of magnetic diffusion constant and Kolmogorov entropy in a stochastic field region, 17:32396 (R;CN;In Chinese)

The development and improvement of a fault tree program, 17:32507 (R;CN;In Chinese)

The development of computer codes for NPP fuel behavior analysis at IAE, 17:32506 (R;CN;In Chinese)

The dynamic response of the containment of the Qinshan nuclear power plant to the aircraft impact loading, 17:30888 (R;CN;In Chinese)

The effects of ^{60}Co γ-ray irradiation on the cytoskeleton of mouse peritoneal macrophages and human peripheral blood monocytes in vitro, 17:31873 (R;CN;In Chinese)

The experimental determination of the primary system resistance for 5MW heating test reactor, 17:30970 (R;CN;In Chinese)

The in-pile proving test for fuel assembly of Qinshan nuclear power plant, 17:30881 (R;CN;In Chinese)

The model and optimization of HTGR nuclear fuel cycle: Pt. 2: Multi-reactor model, 17:30922 (R;CN;In Chinese)

The model and optimization of HTGR nuclear fuel cycle: Pt. 1: Mono-reactor model, 17:30923 (R;CN;In Chinese)

The research on the measuring method and equipment of fast neutron absorption dosimetry and international intercomparison, 17:31544 (R;CN;In Chinese)

The research progress on plant mutant germplasm resources in China, 17:31859 (R;CN;In Chinese)

The suppression of multiple tearing modes using helical field, 17:32395 (R;CN;In Chinese)

The technology and application study of NTD CZ silicon for pressure sensing elements, 17:31602 (R;CN;In Chinese)

The time-space structure evolution of tokamak plasma under the mutual interactions of tearing mode with transport process, 17:32398 (R;CN;In Chinese)

Theoretical study of aluminium-copper impedance matching targets for laser-high-pressure state equation, 17:31411 (R;CN;In Chinese)

Thermocouple calibration facility for 2900 deg C high temperature and its applications, 17:31607 (R;CN;In Chinese)

Transport processes of conversion electron in surface layers, 17:32371 (R;CN;In Chinese)

Using helium mass-spectrometer leak detector to detect the leak of vaporizer in Qinshan nuclear power plant, 17:30885 (R;CN;In Chinese)

Using probability density distribution analysis of bubble diameter and spatial frequency analysis to identify flow pattern of two-phase flow in an unvisual pipe, 17:31377 (R;CN;In Chinese)

Using tritium oxide to study moisture transfer in drying phase of mixed dry and wet grain, 17:30788 (R;CN)

Chinese Nuclear Data Center, Beijing, BJ (China)

Communication of nuclear data progress: No.4(1990), 17:32204 (R;CN)

Christian Michelsens Inst. for Vitenskap og Aandsfrihet, Bergen (Norway)

Petroleum taxation and the incentives for exploration and development, 17:30575 (R;NO)

Civilforsvarsstyrelsen, Birkeroed (Denmark)

Plan for national nuclear emergency preparedness, 17:31986 (I;DK;In Danish)

Clarkson Univ., Potsdam, NY (United States). Dept. of Chemistry

Study of the atmospheric chemistry of radon progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992, 17:31912 (R;US)

Cohen (S.) and Associates, Inc., McLean, VA (United States)

History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants, 17:30897 (R;US)

College of West Virginia, Beckley, WV (United States)

Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)

Colorado School of Mines, Golden, CO (United States). Dept. of Chemical Engineering and Petroleum Refining

Enhancing low severity coal liquefaction reactivity using mild chemical pretreatment: Quarterly technical progress report, December 1991–February 1992, 17:30455 (R;US)

Colorado State Univ., Fort Collins, CO (United States). Dept. of Atmospheric Science

Studies of the role of clouds in CO_2-induced climate change: Progress report, September 15, 1991–September 14, 1992, 17:31646 (R;US)

Colorado Univ., Boulder, CO (United States)

Physics of correlated systems: Progress report, December 1, 1991–November 30, 1992, 17:32358 (R;US)

Theoretical nuclear physics: Progress report, October 1, 1991–August 1, 1992, 17:32206 (R;US)

Colorado-Ute Electric Association, Inc., Montrose, CO (United States)

NUCLA Circulating Atmospheric Fluidized Bed Demonstration Project: 1989 Annual report, [January 1989–December 1989], 17:30543 (R;US)

Columbia Gas System Service Corp., Columbus, OH (United States)

Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report, 17:30589 (R;US)

Columbia Natural Resources, Inc., Charleston, WV (United States)

Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report, 17:30589 (R;US)

Columbia Univ., New York, NY (United States)

Theoretical basis for advanced plasma configurations, 17:32403 (R;US)

Comision de Energia Atomica, La Habana (Cuba)

Basic analysis of sugar cane lead and cane fields of an AIC, 17:31686 (I;CU;In Spanish)

Calchulation of physical parameters of the subcritical assembly located in the higher Institute of Nuclear Sciences and Technology, 17:30939 (I;CU;In Spanish)

Effectiveness in detecting fission fragments with ionization chambers, 17:32342 (I;CU;In Spanish)

Geologichal effectiveness of nuclear trace method in uranium prospecting, 17:31543 (I;CU;In Spanish)

Measurement of the removal sechtion of biological protection concretes in the spectrum of an AmBe source, 17:32343 (I;CU;In Spanish)

Method of characterization of high temperature superconductor ceramics, 17:31252 (I;CU;In Spanish)

Shielding chalculations in x-rays installations for medical diagnosis. description of the method and computational solution, 17:30782 (I;CU;In Spanish)

Commission of the European Communities, Luxembourg (Luxembourg)

Acoustic monitoring techniques for corrosion degradation in cemented waste canisters, 17:30691 (R;FR)

Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)

Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)

Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)

HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

Life cycle cost analysis of solar heating and DHW systems in residential buildings, 17:30820 (R;FR)

Quality assurance of radioactive waste packages by computerized tomography, 17:30692 (R;FR)

Radioactive waste package assay facility. Volume 1. Application of assay technology, 17:30688 (R;FR)

Radioactive waste package assay facility. Volume 2. Investigation of active neutron and active gamma interrogation, 17:30689 (R;FR)

Radioactive waste package assay facility. Volume 3. Data processing, 17:30690 (R;FR)

Repository tunnel construction in deep clay formations, 17:30697 (R;FR)

Research on backfilling and sealing of Rooms and Galleries in a repository in salt, 17:30696 (R;FR;In German)

Survey of EEC solid waste arisings and performance of non-destructive assay systems, 17:30695 (R;FR)

The HADES demonstration and pilot project on radioactive waste disposal in a clay formation, 17:30687 (R;FR)

The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)

Connecticut Univ., Storrs, CT (United States)

Structure sensitive reactions over Co, Fe and mixed metal clusters in zeolites: Annual technical progress report, 17:31314 (R;US)

Cornell Univ., Ithaca, NY (United States)

Experimental study of interactions of highly charged ions with atoms at keV energies: Progress report, July 1, 1991–June 30, 1992, 17:32357 (R;US)

Studies of the III-V compounds in the megabar regime: Technical progress report, 17:31222 (R;US)

[Mechanisms of inhibition of viral replication in plants]: Progress report, 17:30797 (R;US)

Cornell Univ., Ithaca, NY (United States). Lab. of Atomic and Solid State Physics

Photochemical dynamics of surface oriented molecules: Progress report, August 1, 1991–July 31, 1992, 17:31323 (R;US)

Cowiconsult Raadgivende Ingenioerer A/S, Virum (Denmark)

Analysis of advantages to be gained by users through utilizing SAFECOM CL computers in lorries, 17:31121 (I;DK;In Danish)

LASTCOMP - electronic data processing for transportation by lorries: Final report, 17:31120 (I;DK;In Danish)

LASTCOMP - electronic data processing for transportation by lorries, 17:31122 (I;DK;In Danish)

D

Danmarks Tekniske Hoejskole, Lyngby (Denmark)

Electrode materials for solid state batteries, 17:31044 (I;DK;In Danish, English)

Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Koeleteknik

Adaptive control of a refrigeration system: Feasibility analysis and controller design, 17:31098 (R;DK)

CFC environmental problems and cooling technology, 17:31647 (R;DK;In Danish)

Danmarks Tekniske Hoejskole, Lyngby (Denmark). Lab. for Varmeisolering

Analysis of heat accumulation capacities in relation to residential buildings: Literature study, 17:31101 (R;DK;In Danish)

Analysis of heat accumulation capacities in relation to residential buildings, 17:31106 (R;DK;In Danish)

Efficient domestic hot water heating, 17:31105 (R;DK;In Danish)

General computer programme for the calculation of areas of shadow on level surfaces, 17:31100 (R;DK;In Danish)

Insulating shutters, 17:31103 (R;DK;In Danish)

Measurement and calculations of the solar radiation through glass areas, taking into consideration the objects shadowing the low energy house G in Hjortekaer, 17:31099 (R;DK;In Danish)

Optimal design of windows: An investigation of heat technology, 17:31102 (R;DK;In Danish, English)

Solar heating system for the combined space heating of and domestic hot water: Development of a competitive system. Calculations and measurements in relation to the test plant, 17:30825 (R;DK;In Danish)

The influence of heat bridges on heat losses in buildings, 17:31104 (R;DK;In Danish)

Dansk Byplanslaboratorium, Copenhagen (Denmark)

Urban ecological initiatives, 17:31056 (I;DK;In Danish)

Dansk Teknologisk Inst., Skovlunde (Denmark). Emballage- og Transportinstituttet

Analysis of advantages to be gained by users through utilizing SAFECOM CL computers in lorries, 17:31121 (I;DK;In Danish)

LASTCOMP - electronic data processing for transportation by lorries: Final report, 17:31120 (I;DK;In Danish)

LASTCOMP - electronic data processing for transportation by lorries, 17:31122 (I;DK;In Danish)

Dansk Teknologisk Inst., Taastrup (Denmark). Auto- og Motorteknik

Fitting catalytic converters on cars, 17:31664 (I;DK;In Danish)

Dansk Teknologisk Inst., Taastrup (Denmark). Energiteknologi

Analysis of heat accumulation capacities in relation to residential buildings, 17:31106 (R;DK;In Danish)

Dartmouth Coll., Hanover, NH (United States). Thayer School of Engineering

Mixing and settling in continuous metal production: Progress report, September 15, 1991–May 31, 1992, 17:31221 (R;US)

Denison Mines Ltd., Toronto, ON (Canada)

Development of a joint labour-management safety inspection system at Denison operations, 17:30632 (IA;CA)

Pilot ALARA analysis applied to dose reduction in an underground uranium mine, 17:30609 (IA;CA)

Dk-TEKNIK, Aalborg (Denmark). Energi og Miljoe

Emission of non-combusted hydrocarbons from stationary motors and turbines, 17:31663 (I;DK;In Danish)

Natural-gas-fired cogeneration plants with an electric power output of up to 1000 kW: Technology - Environment - Economy, 17:31147 (I;DK;In Danish)

Doty Scientific, Inc., Columbia, SC (United States)

Microtube strip heat exchanger: Final technical report, 17:31125 (R;US)

Douglas United Nuclear, Inc., Richland, WA (United States)

Reactor operations daily reports, July 1, 1967–June 30, 1968, 17:30980 (R;US)

Reactor Operations daily reports, July 1, 1968–August 31, 1968: Rough draft, 17:30981 (R;US)

Reactor Operations daily reports, July 1, 1970–June 30, 1971, 17:31007 (R;US)

Dow Chemical U.S.A., Midland, MI (United States)

LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)

Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States)

Technical summary of groundwater quality protection program at the Savannah River Site (1952–1986): Volume 2, Groundwater monitoring results, 17:31696 (R;US)

Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States). Savannah River Lab.

Inspection of irradiated Mark 18 fuel tubes, 17:30976 (R;US)

Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States)

Reactor shield tests, 17:30979 (R;US)

Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Atomic Energy Div.

T metal analytical samples, 17:31224 (R;US)

Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept.

Project 8980: Fluorophotometers for laboratory services, 17:31357 (R;US)

Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)

Scintillation counter: Moderator purification, 17:30977 (R;US)

Technical Section Coordinating Committee meeting, 17:30978 (R;US)

Visit of Wayne Hazen, Los Alamos October 15–16, 1952, 17:31356 (R;US)

Duke Univ. Medical Center, Durham, NC (United States). Dept. of Radiology

SPECT assay of radiolabeled monoclonal antibodies: Third yearly progress report, September 1991–February 1992, 17:31777 (R;US)

SPECT assay of radiolabeled monoclonal antibodies: Comprehensive progress report, September 1989–February 1992, 17:31778 (R;US)

E

Ebasco Services, Inc., Oak Ridge, TN (United States)

Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)

EG and G Energy Measurements, Inc., Las Vegas, NV (United States)

Shielded helix traveling wave cathode ray tube deflection structure, 17:31415 (PA;US)

Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project, 17:30669 (R;US)

EG and G Idaho, Inc., Idaho Falls, ID (United States)
A development approach for nuclear thermal propulsion, 17:30914 (R;US)
A method of noncontacting ultrasonic process monitoring, 17:31262 (PA;US)
A model for calculation of RCS pressure during reflux boiling under reduced inventory conditions and its assessment against PKL data, 17:31008 (R;US)
A survey of fatigue monitoring in the nuclear power industry, 17:30941 (R;US)
A vacuum disengager for tritium removal from HYLIFE-II Reactor Flibe, 17:32457 (R;US)
ADASAGE40: Ada application development system, 17:32519 (CM;US)
Aging data analysis and risk assessment: Development and demonstration study, 17:31024 (R;US)
An integrated optical sensor for GMAW feedback control, 17:31358 (R;US)
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)
Countercurrent flow-limiting characteristics of a Savannah River Plant control rod septifoil, 17:31011 (R;US)
Fabrication of high temperature materials by exothermic synthesis and subsequent dynamic consolidation, 17:31276 (PA;US)
Idaho National Engineering Laboratory response to the December 13, 1991, Congressional inquiry on offsite release of hazardous and solid waste containing radioactive materials from Department of Energy facilities, 17:30663 (R;US)
Independent verification and benchmark testing of the UNSAT-H computer code, Version 2.0, 17:31697 (R;US)
Independent verification and validation testing of the FLASH computer code, Versiion 3.0, 17:31698 (R;US)
Investigation of component failure rates for pulsed versus steady state tokamak operation, 17:32455 (R;US)
Methodology to identify risk-significant components for inservice inspection and testing, 17:31010 (R;US)
Most likely failure location during severe accident conditions, 17:31009 (R;US)
Natural convection between a vertical cylinder and a surrounding array, 17:31388 (R;US)
OJT...make 'em or break 'em, 17:32490 (R;US)
Particle-fluid two-phase flow modeling, 17:31390 (R;US)
Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility), 17:30993 (R;US)
Recommendations on frequently encountered relief requests, 17:30942 (R;US)
Refractory thermowell for continuous high temperature measurement of molten metal, 17:31609 (PA;US)
Risk assessment handbook, 17:30759 (R;US)
Risk assessment technique for evaluating research laboratories, 17:32007 (R;US)
Study of wall heat transfer from a high temperature dissociated hydrogen impinging jet, 17:31160 (R;US)
Test plan for air monitoring during the Cryogenic Retrieval Demonstration, 17:31648 (R;US)
The influence of processing atmosphere on twin-roll melt-spinning of aluminum alloys, 17:31228 (R;US)
TRAC-BF1/MOD1 models and correlations, 17:31021 (R;US)
Turbulent natural convection between a perforated vertical cylinder and a surrounding array, 17:31389 (R;US)
Two-phase flow modeling with discrete particles, 17:31129 (R;US)
Verification and validation of TMAP4, 17:32456 (R;US)
Waste management in an environmental chemistry laboratory, 17:30686 (R;US)
"You need this done by when?": Increasing your efficiency with the SAS® system, 17:32518 (R;US)

EG and G Idaho, Inc., Idaho Falls, ID (United States). National Low-Level Waste Management Program
Annotated list of regulations and guidance applicable to temporary storage of commercial Low-Level Radioactive Waste, 17:30667 (R;US)
Low-Level Radioactive Waste temporary storage issues, 17:30666 (R;US)

EG and G Mound Applied Technologies, Miamisburg, OH (United States)
Development of a laser ignited all secondary explosive DDT detonator, 17:31632 (R;US)

EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant
Calculation of binary phase diagrams between the actinide elements, rare earth elements, and transition metal elements, 17:31238 (R;US)
Development of location criteria for criticality alarm detector placements, 17:31362 (R;US)
Preliminary assessment of RTR and visual characterization for selected waste categories, 17:30716 (R;US)
RFEDSCHK User's Manual (The RFEDS Lab Data Check routine), Environmental and Scientific Systems Information Resources: Version 1.00, 17:32561 (R;US)
Summary of a graded approach to fire hazard analysis, 17:30762 (R;US)
The effect of precipitate forming elements in Al 4.5% Mg alloys on the measured acoustic emission and on Lueders band deformation, 17:31239 (R;US)
Thermal stress and strain analysis in traveling autogenous welds, 17:31363 (R;US)
Using MACCS for on-site worker dose calculations, 17:32002 (R;US)

EG and G, Inc., Goleta, CA (United States). Santa Barbara Operations
Endangered Species Program Naval Petroleum Reserves in California: Annual report FY90, 17:30579 (R;US)

Eltron Research, Inc., Aurora, IL (United States)
Perovskite solid electrolytes for SOFC, 17:31080 (R;US)

Empresa Brasileira de Pesquisa Agropecuaria, Campinas, SP (Brazil). Centro Nacional de Pesquisa de Defesa da Agricultura
Integrated control of Sclerotinia sclerotiorum with Benomyl and and Trichoderma harzianum resistant to benzimidazoles, 17:31923 (IA;BR;In Portuguese)
Proceedings of the 4. Brazilian Meeting on biological control of plant diseases, 17:31864 (I;BR;In Portuguese)

Energetics, Inc., Columbia, MD (United States)
Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)
Industrial innovations for tomorrow: Advances in industrial energy-efficiency technologies: Degradable plastic made from potato peels, 17:31128 (R;US)
Proceedings of the DOE/Advanced Heat Exchangers Program Review: Summary report, 17:31095 (R;US)

Energy and Environmental Research Corp., Irvine, CA (United States)
A process control sensor for the glass industry: Phase 1, Extended development program, 17:31256 (R;US)

Energy Research Corp., Danbury, CT (United States)
Understanding of carbonate fuel cell resistance issues for performance improvement, 17:31084 (R;US)

European Physical Society, Geneva (Switzerland)
12th general conference of the condensed matter division of the E.P.S. V.16A., 17:32372 (I;CS)
Neutron diffraction study of $Sr_xBa_{1-x}Nb_2O_6$ crystals, 17:32373 (IA;CS)

F

Federal Emergency Management Agency, Washington, DC (United States)
Emergency Response Resources guide for nuclear power plant emergencies: Revision 1, 17:31016 (R;US)

Fermi National Accelerator Lab., Batavia, IL (United States)
Development of radiation hard scintillators, 17:31603 (R;US)
Particle production and survival in muon acceleration, 17:32189 (R;US)

Finnish Energy Economy Association, Helsinki (Finland)
The corrosion on the surfaces of airpreheaters and electrostatic precipitators in peat-fired boilers, 17:30553 (R;FI;In Finnish)

Florida Univ., Gainesville, FL (United States)
Studies of granular flow down an inclined chute: Quarterly technical progress report, March 13, 1992–June 12, 1992, 17:30535 (R;US)

Ford Motor Co., Dearborn, MI (United States). Research Staff
Single-shaft electric propulsion system technology development program – ETX-II: Final technical report, 17:31186 (R;US)

Forest Service, WY (United States). Nez Perce National Forest
South Fork Clearwater River habitat enhancement - Nez Perce National Forest, 17:30818 (R;US)

Frankfurt Univ. (Germany). Inst. fuer Kernphysik
Application of the Rutherford backscattering analysis (RBS analysis) for detecting heavy impurity elements in pBN crucible materials. Final report, 17:31298 (I;DE;In German)
The nuclear reaction analysis (NRA) as a means for detecting carbon in GaAs and in source materials and additives. Final report, 17:31299 (I;DE;In German)

G

General Atomics, San Diego, CA (United States)
Fusion programs in Applied Plasma Physics: Contract extension report, October 1, 1991–January 31, 1992, 17:32426 (R;US)
Future development of the DIII-D tokamak program, 17:32459 (R;US)
Impact of increasing MHTGR power on passive heat removal, 17:30903 (R;US)

General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation
Chemical decontamination of Hanford production reactors, 17:30990 (R;US)
Fuels Preparation Department monthly report, August 1960, 17:30988 (R;US)
Hanford Atomic Products Operation monthly report, July 1955, 17:30985 (R;US)
Hanford Atomic Products Operation monthly report, October 1955, 17:30987 (R;US)
Preliminary investigation of water coagulation characteristics as affects reactor effluent radionuclides, 17:30967 (R;US)
Test results for Supplement A to Production Test IP 358 AC, 17:30989 (R;US)

General Electric Co., Schenectady, NY (United States). Corporate Research and Development Center
Single-shaft electric propulsion system technology development program – ETX-II: Final technical report, 17:31186 (R;US)

General Electric Co., Sunnyvale, CA (United States). Advanced Reactor Systems Dept.
GENED ENV ROUTINES: Subroutine library, 17:32521 (CM;US)

Geo-Microbial Technologies, Inc., Ochelata, OK (United States)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991, 17:30447 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991, 17:30448 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)

Geological Survey of Canada, Ottawa, ON (Canada)
Age relationships from U-Th-Pb isotope studies of uranium mineralization in Wernecke breccias, Yukon Territory, 17:30605 (RA;CA)
Current research. Part A, 17:32011 (R;CA)
Developments in uranium geology in Canada, 1985, 17:30606 (RA;CA)
Gold occurrence in radioactive calc-silicate float at Sandybeach Lake, Nueltin Lake area, District of Keewatin, 17:30607 (RA;CA)

Geological Survey of Finland, Espoo (Finland)
Inventory of mires and peat resources, Parkano, Western Finland. Part 1, 17:30504 (R;FI;In Finnish)
The peat recources of Ylaemaa and their usefulness, 17:30501 (R;FI;In Finnish)
The peat resources and their potential use in Kihnioe, Western Finland, 17:30506 (R;FI;In Finnish)
The peat resources of Aehtaeri and their potential use. Part 1, 17:30495 (R;FI;In Finnish)
The peat resources of Aehtaeri and their potential use. Part 2, 17:30517 (R;FI;In Finnish)
The peat resources of Kuortane and their potential use, 17:30512 (R;FI;In Finnish)
The peat resources of Miehikkaelae and their usefulness, 17:30487 (R;FI;In Finnish)
The peat resources of Toeysae and their potential use, 17:30515 (R;FI;In Finnish)
Utilization of ADP in peat inventory and research, 17:30491 (R;FI;In Finnish)

Geological Survey of Finland, Kuopio (Finland)
The mires and peat resources of the commune of Suonenjoki and their potential use, 17:30490 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 7, 17:30497 (R;FI;In Finnish)
The mires and peat resources of the commune of Isokyroe and their potential use. Part 1, 17:30498 (R;FI;In Finnish)
The mires and peat resources of the commune of Utajaervi and their potential use. Part 4, 17:30499 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 8, 17:30510 (R;FI;In Finnish)
The mires and peat resources of the commune of Utajaervi and their potential use. Part 5, 17:30511 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 9, 17:30516 (R;FI;In Finnish)
The mires and their peat resources in Oulainen, 17:30489 (R;FI;In Finnish)
The mires and their peat resources in Jaeppilae: Part 2 and summary, 17:30494 (R;FI;In Finnish)
The mires and their peat resources in Nilsiae, 17:30505 (R;FI;In Finnish)
The mires and their peat resources in Liminka, Lumijoki and Temmes, 17:30507 (R;FI;In Finnish)
The mires and their peat resources in Outokumpu. Part 1, 17:30508 (R;FI;In Finnish)
The mires and their potentialities in peat production in the municipality of Ilomantsi, 17:30513 (R;FI;In Finnish)
The mires and their resources in Kiuruvesi, 17:30492 (R;FI;In Finnish)
The peat resources of Hankasalmi and their usefulness. Part 1, 17:30502 (R;FI;In Finnish)
The peat resources of seven peat deposits in the commune of Lestijaervi in Western Finland, 17:30493 (R;FI;In Finnish)
The peat resources of seventeen peat deposits in the commune of Reisjaervi in Western Finland, 17:30503 (R;FI;In Finnish)
The peat resources of seventeen peat deposits in the commune of Kannonkoski in Central Finland, 17:30514 (R;FI;In Finnish)
The peat resources of the municipality of Juuka and their potentialities in fuel peat production. Part 1, 17:30488 (R;FI;In Finnish)
The peat resources of the municipality of Ilomantsi and their potentialities in fuel peat production. Part 1, 17:30496 (R;FI;In Finnish)

Geological Survey of Finland, Rovaniemi (Finland)
Inventory of mires and peat resources in Simo. Part 2, 17:30509 (R;FI;In Finnish)
The mires and peat resources of the commune of Simo in 1985-1986 and their potential use, 17:30500 (R;FI;In Finnish)

Geological Survey of Japan, Tsukuba, Ibaraki (Japan)
Analysis and evaluation of data from the nationwide survey of geothermal exploration, 17:30841 (I;JP;In Japanese)
Analysis and evaluation of information network system, 17:32573 (IA;JP;In Japanese)
Analysis and evaluation of knowledge base and rule. Part 1.: Geochemical classification and significance of original water relating to geothermal system, 17:30851 (IA;JP;In Japanese)
Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)

Analysis and evaluation of resistivity data.: MT profiling of the southerm Tohoku district, 17:32010 (IA;JP;In Japanese)
Basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map 'Niigata', 17:30836 (IA;JP;In Japanese)
Comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data, 17:30843 (IA;JP;In Japanese)
Compilation of a gravity map on 1/500,000 Niigata sheet, 17:32009 (IA;JP;In Japanese)
Hypothesis on competition of thermal conduction zone and juvenile hydrothermal solution retention zones in the surroundings of magma, 17:30840 (IA;JP;In Japanese)
Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan, 17:30832 (I;JP;In Japanese)
Preparation of geothermal resource map of Japan, 17:30833 (IA;JP;In Japanese)
Statistical distribution of temperatures and physical properties of geothermal areas in Japan, based on logging and core data of boreholes, 17:30839 (IA;JP;In Japanese)
Study of geothermal resource evaluation by potential water volume method, 17:30834 (IA;JP;In Japanese)
Study on collection of resource evaluation bases in the northern Tohoku district (Akita-Koma).: Geological survey of Tashirodake and Tara-Komagadake areas, 17:30835 (IA;JP;In Japanese)
Temperature gradient map of the Japanese Islands, 17:30850 (IA;JP;In Japanese)
Underground structure and temperature structure of the Aso area obtained from gravity and magnetic analysis, 17:30842 (IA;JP;In Japanese)

Geological Survey, Denver, CO (United States)
Earthquake-induced water-level fluctuations at Yucca Mountain, Nevada, April 1992, 17:31747 (R;US)

Geological Survey, Idaho Falls, ID (United States)
Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)

George Washington Univ., Washington, DC (United States). Center for Nuclear Studies
Investigations of the structure and electromagnetic interactions of few-body systems: Progress report, 1 August 1991–31 July 1992, 17:32205 (R;US)

Gesellschaft fuer Schwerionenforschung mbH, Darmstadt (Germany)
An 'in acceptance' comparison of Si + Au data and RQMD predictions, 17:32286 (IA;DE)
Analysis of discrete ambiguities for $\pi N \Delta$ and $\rho N \Delta$ vertex functions using inclusive charge-exchange reactions, 17:32256 (IA;DE)
Baryon and pion distributions from nucleus-nucleus collisions at 15 GeV/nucleon, 17:32287 (IA;DE)
Chiral symmetry in particle physics and its manifest realization in terms of parity doublets, 17:32094 (IA;DE)
Collisions in an expanding pion gas and the pperpendicular to spectrum in ultrarelativistic heavy ion collisions, 17:32301 (IA;DE)
Coupling and decoupling of pions and deltas in nuclear matter, 17:32225 (IA;DE)
Detection of neutrons by BAF$_2$ TAPS modules in relativistic heavy ion collisions, 17:31566 (IA;DE)
Dilepton radiation from partially equilibrated parton matter, 17:32141 (IA;DE)
Dynamical simulation of quark systems within a covariant transport approach, 17:32160 (IA;DE)
Exclusive studies of neutron and charged particle emission in relativistic heavy ion reactions, 17:32290 (IA;DE)
Experimental considerations to measure thermal photons at RHIC, 17:32288 (IA;DE)
Finite positive pion chemical potential and lepton pair production in heavy ion collisions, 17:32300 (IA;DE)
Fluctuations of multiplicities in rapidity windows in sulphur-sulphur collisions at 200 AGeV, 17:32293 (IA;DE)
FOrPI studies of Au on Au collisions at SIS energies, 17:32289 (IA;DE)
Fragmentation in the string-flux tube model, 17:32095 (IA;DE)
Fragmentation of gold projectiles: From evaporation to vaporization, 17:32291 (IA;DE)
Gross properties of nuclei and nuclear excitations. Proceedings, 17:32285 (I;DE)
Hadronic and quark screening lengths from lattice QCD, 17:32140 (IA;DE)
Hadronic gas models and equilibration in heavy ion collisions, 17:32295 (IA;DE)
Hadronic sources of dileptons from heavy ion collisions at intermediate and relativistic energies, 17:32299 (IA;DE)
Inclusion of fluctuations in BUU nuclear dynamics, 17:32254 (IA;DE)
Kaon condensation in dense hadronic matter, 17:32227 (IA;DE)
Medium dependent pion-production in heavy-ion collisions within the quantum molecular dynamics, 17:32307 (IA;DE)
Medium effects on quark and meson masses, 17:32191 (IA;DE)
Modifications of scalar and vector mesons in nuclear matter, 17:32226 (IA;DE)
N-body collisions in high-energy nuclear reactions, 17:32298 (IA;DE)
NA 38 future, 17:32135 (IA;DE)
Nucleon electric form factors and quark sea polarization in the Nambu-Jona-Lasinio model, 17:32138 (IA;DE)
Nucleus as a canonical ensemble, 17:32222 (IA;DE)
Onset of multifragmentation in medium energy heavy ion collisions, 17:32302 (IA;DE)
Particle production at SIS energies and the nuclear equation of state, 17:32296 (IA;DE)
Pauli blocking and dynamical multifragmentation calculations, 17:32257 (IA;DE)
Phase-transitions in nuclear matter: Deconfinement of quarks and gluons?, 17:32220 (IA;DE)
Properties of the ρ-meson in dense nuclear matter, 17:32224 (IA;DE)
Relativistic BUU-approach with momentum-dependent mean-fields, 17:32306 (IA;DE)
Relativistic mean-field three-fluid model for intermediate-energy heavy-ion collisions. Simulation of kinetic results, 17:32304 (IA;DE)
Relativistic quantum hadron molecular dynamics (RQHMD) for heavy collisions, 17:32305 (IA;DE)
Relativistic transport equations from quantum field theory, 17:32255 (IA;DE)
Scale and chiral symmetry breaking at finite density in the NJL model, 17:32093 (IA;DE)
Scaling effects and properties of Δ-isobar resonances, 17:32192 (IA;DE)
Small angle correlations of intermediate mass fragments in reactions Au + Au at E/A = 100, 150, 250 MeV, 17:32292 (IA;DE)
Stopping power and viscosity of the quark-gluon plasma, 17:32136 (IA;DE)
Subthreshold kaon production in 1 GeV/u Au+Au collision within quantum molecular dynamics, 17:32303 (IA;DE)
Surface multifragmentation investigated with a finite temperature spherical TDHF model, 17:32258 (IA;DE)
Systematics of charm hadroproduction, 17:32159 (IA;DE)
The chiral and the deconfinement phase transition in the chromodielectric model, 17:32139 (IA;DE)
The high-energetic component in pion spectra from Au + Au and Ne + NaF at 1 GeV/u$^+$, 17:32297 (IA;DE)
The meson contribution to semi-inclusive deep inelastic scattering with slow protons in the final state, 17:32161 (IA;DE)
The self consistent quark-gluon plasma, 17:32137 (IA;DE)
Thermal properties and medium effects in the study of heavy-ion collisions with realistic NN interactions, 17:32294 (IA;DE)
Two-loop corrections for nuclear matter in the Walecka model with form factors, 17:32223 (IA;DE)
'Local' EMC effects and the J/ψ suppression, 17:32221 (IA;DE)

Gleason (Thomas C.J.), Washington, DC (United States)
Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems, 17:31059 (R;US)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst.
- Boiling crisis in water forced flow in tubes, 17:31391 (R;SU;In Russian)
- Boundary void fraction in water flow in tubes, 17:31393 (R;SU;In Russian)
- Modelling of freon heat transfer in water under supercritical pressure, 17:31392 (R;SU;In Russian)
- REMP1-PC computer code for optimization of radiation shields characteristics, 17:32344 (R;SU;In Russian)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij
- Does the quantization of a particle with curvature lead to the Dirac equation, 17:32092 (R;SU)
- Scattering problem with complex potential as a problem with zero boundary values and its solution with finite element method, 17:32091 (R;SU;In Russian)
- Single t-quark production in high energy γe collisions, 17:32158 (R;SU)

Grambling State Univ., LA (United States). Dept. of Chemistry
- Rheological properties essential for the atomization of coal water slurries (CWS): Quarterly progress report, March 15, 1992–June 15, 1992, 17:30472 (R;US)

Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)
- A new radiation safety control system for Ganil, 17:31431 (R;FR)
- A non interceptive heavy ion beam profile monitor based on residual gas ionization, 17:31484 (R;FR)
- Capacitive beam position monitors and automatic beam centering in the transfer lines of Ganil, 17:31453 (R;FR)
- Comment on the width and the life-time of multiphonon states, 17:32218 (R;FR)
- Electromagnetic decay of two-phonon states, 17:32247 (R;FR)
- Finite size effects in the intermittency analysis of the fragment-size correlations, 17:32252 (R;FR)
- Finite-size scaling in the multiparticle production, 17:32156 (R;FR)
- From experimental monopole cross-sections to nuclear incompressibilities, 17:32219 (R;FR)
- Hard photon intensity interferometry in heavy ion reactions, 17:32253 (R;FR)
- Intermittency in the particle production and in the nuclear multifragmentation, 17:32132 (R;FR)
- Quantum tunneling in the periodically driven SU(2) model, 17:32020 (R;FR)
- Recent improvements and new possibilities of the Ganil facility, 17:31432 (R;FR)

Grenoble-1 Univ., 38 (France)
- Development of a programmable CCD detector for imaging, real time studies and other synchrotron radiation applications, 17:31551 (R;FR;In French)

Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires
- Lambda attachment in fission: a probe of the necking dynamics, 17:32319 (R;FR)
- Measurement and analysis of charge partitions in nuclear disassembly, 17:32268 (R;FR)
- Some open issues in nucleon-antinucleon interaction, 17:32164 (R;FR)
- The surface compression of nuclei in relativistic mean-field approach, 17:32232 (R;FR)

Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules Elementaires
- A comparison of the real-time and the imaginary-time formalisms of finite temperature field theory for 2,3, and 4-point Green's functions, 17:32121 (R;FR)
- A data simulation program for the VIRGO detector, 17:31585 (R;FR)
- A Polyakov action on Riemann surfaces, 17:32118 (R;FR)
- A quasi-parafermionic realization of G_2 and $U_q(G_2)$, 17:32040 (R;FR)
- Continuous realizations of extended conformal algebras, 17:32120 (R;FR)
- Electromagnetic interactions and chirality flip of neutrinos in a thermal background, 17:32199 (R;FR)
- Exotic fermion mixing revisited, 17:32149 (R;FR)
- Experimental study of charmed baryons at SuperLEAR, 17:32176 (R;FR)
- Finiteness of the topological models in the Landau gauge, 17:32117 (R;FR)
- General construction of the Virasoro algebra from superalgebras, 17:32116 (R;FR)
- Higgsometry from Ultimate LEP, 17:32200 (R;FR)
- High resolution crystal calorimetry at LHC, 17:31584 (R;FR)
- Infrared singularities cancellation in reaction rates at finite temperature, 17:32115 (R;FR)
- Linear supermultiplets and non-holomorphic gauge coupling functions, 17:32119 (R;FR)
- Massive fermion dispersion relation at finite temperature, 17:32150 (R;FR)
- Phenomenology of one extra neutral Z, 17:32198 (R;FR)
- Spontaneous decoupling of extended Gauge models, 17:32148 (R;FR)
- The algebraic versus geometric approach to quantum field theory, 17:32113 (R;FR)
- Three-dimensional Ising Model and 2d-induced gravity, 17:32114 (R;FR)

GSF - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Neuherberg (Germany)
- Status report on geochemical modelling, 17:30700 (R;DE)

H

Hahn-Meitner-Institut Berlin GmbH (Germany). Bereich Datenverarbeitung und Elektronik
- Realization of a Lagrange-simulation model for dispersion calculations, 17:31649 (R;DE;In German)

Hanford Atomic Products Operation, Richland, WA (United States)
- Interim report - Production Test MR-105-12 crossheader purge with chromic acid, 17:30986 (R;US)

Hanford Works, Richland, WA (United States)
- Analytical services - Pile area laboratories, 17:30984 (R;US)
- H.I. report on the 200 Areas and associated laboratories for the week ending August 27, 1947, 17:30755 (R;US)

Harvard Univ., Boston, MA (United States)
- Inclusive charged hadron and K^0 production in two-photon interactions, 17:32181 (R;US)

Harvard Univ., Cambridge, MA (United States)
- [Mathematics and string theory]: [Annual progress report], 17:32073 (R;US)

Harvard Univ., Cambridge, MA (United States). Div. of Applied Sciences
- Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991, 17:31270 (R;US)

Hebrew Univ., Jerusalem (Israel)
- ^{36}Cl in rainwater in Israel, 17:31704 (IA;IL)
- Annual meeting of the Israel Geological Society, 1989, 17:32013 (I;IL)
- Boron isotope geochemistry in the terrestrial environment, 17:31715 (IA;IL)
- Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments, 17:31706 (IA;IL)
- Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee, 17:31712 (IA;IL)
- Evidence for the origin of Ca in land snails living on basalts (Golan Heights) from their strontium isotopic composition, 17:31714 (IA;IL)
- Involvement of fluids in regional metamorphism: A preliminary study of carbonate isotope compositional profiles on Sifnos (Cyclydes, Greece), 17:31711 (IA;IL)
- The isotopic composition of strontium in Israeli rains, 17:31705 (IA;IL)

Hebrew Univ., Jerusalem (Israel). Dept. of Physics
- ^{36}Cl in rainwater in Israel, 17:31704 (IA;IL)

Heidelberg Univ. (Germany). Fakultaet fuer Physik und Astronomie

Methods reducing doppler broadening in laserspectroscopy of stored ions and the isotope shifts of hafnium, 17:32356 (R;DE;In German)

I

IBM Scientific Center, Palo Alto, CA (United States)

AILMOE: X-section calc elastic scat resonances, 17:32541 (CM;US)

AISITE2: Parametric site requirement study, 17:32530 (CM;US)

Illinois State Geological Survey, Champaign, IL (United States)

Carbonation as a binding mechanism for coal/calcium hydroxide pellets: Technical report, December 1, 1991–February 29, 1992, 17:30426 (R;US)

Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992, 17:30552 (R;US)

Desulfurization of hot fuel gas produced from high-chlorine Illinois coals: Technical report, December 1, 1991–February 29, 1992, 17:30459 (R;US)

Research on improved and enhanced oil recovery in Illinois through reservoir characterization, March 28, 1992–June 28, 1992, 17:30566 (R;US)

Sulfur removal from high-sulfur Illinois coal by low-temperature perchloroethylene (PCE) extraction: Technical report, December 1, 1991–February 29, 1992, 17:30458 (R;US)

Illinois Univ., Urbana, IL (United States)

Cooperative research on the combustion characteristics of cofired desulfurized Illinois coal and char with natural gas: Technical report, December 1, 1991–February 29, 1992, 17:30551 (R;US)

Illinois Univ., Urbana, IL (United States). Dept. of Nuclear Engineering

Characterization of jet breakup mechanisms observed from simulant experiments of molten fuel penetrating coolant: Technical progress report, FY 1992, 17:31005 (R;US)

Indiana Univ., Bloomington, IN (United States). Dept. of Physics

Indiana University High Energy Physics Group, Task C: Technical progress report, January 1, 1992–October 31, 1992, 17:32069 (R;US)

Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison (France)

Numerical dispersion reduction by correction of mass flows. Application to the problem of hydrocarbon recovery by chemical processes, 17:30573 (R;FR;In French)

Reflexion tomography: what information is comprised in the incoming times, 17:30563 (R;FR;In French)

Synthesis, characterization and reactivity of some lanthanide organometallics, 17:31316 (R;FR;In French)

Institut National Polytechnique, 38 - Grenoble (France)

Applied and theoretical study of textural and structural evolution of pure and doped zircon powders, 17:31257 (R;FR;In French)

Thermal pretreatment effect on polycrystalline tin dioxide electrical properties. Application to methane detection, 17:31615 (R;FR;In French)

Institute of Energy Economics, Tokyo (Japan)

Minutes of Japan-US energy conference/Maui Meeting, 17:31052 (R;JP;In Japanese)

Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view, 17:31053 (R;JP;In Japanese)

Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1, 17:31054 (R;JP;In Japanese)

Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 2, 17:31055 (R;JP;In Japanese)

Survey of the petroleum trend in Europe, 17:31067 (R;JP;In Japanese)

Trend in energy demand in factory air conditioning.: Analysis by a questionnaire of actual situation of air conditioning for cooling, 17:31130 (R;JP;In Japanese)

Institute of Gas Technology, Chicago, IL (United States)

Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 1, Task 1, PFH scoping studies and Task 2, PFH optimization studies: Final report, September 1987–May 1991, 17:30599 (R;US)

Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991, 17:30600 (R;US)

The MAGSORB process for bulk separation of carbon dioxide: Final report, 17:31296 (R;US)

Institute of Nuclear Physics, Cracow (Poland)

Department of Theoretical Physics. Annual Report 1989, 17:32209 (R;PL)

Instituto Brasileiro de Petroleo, Rio de Janeiro, RJ (Brazil)

Methodological aspects of market study on residential, commercial and industrial sectors, of the Conversion Project for natural gas of existing network in Sao Paulo city, 17:30596 (IA;BR;In Portuguese)

Natural gas participation on brazilian demand supply of liquefied petroleum gas, 17:30597 (IA;BR;In Portuguese)

Proceedings of the 3. international seminar on natural gas, 17:30595 (I;BR;In Portugese)

Instituto de Pesquisas Energeticas e Nucleares (IPEN), Sao Paulo, SP (Brazil)

Production of biological reagents for radioimmunoassay second antibody, 17:31853 (R;BR;In Portuguese)

Institutt for Energiteknikk, Kjeller (Norway)

Institutt for Energiteknikk - Annual report 1991, 17:32493 (I;NO)

Nuclear power - status and development 1991/1992, 17:30925 (R;NO;In Norwegian)

Institutul de Reactori Nucleari Energetici, Pitesti (Romania)

GRENADE: 3d multigp diffusion Green's function, 17:32529 (CM;RO)

International Atomic Energy Agency, Vienna (Austria)

Communications received from certain Member States regarding guidelines for the export of nuclear material, equipment and technology: Nuclear-related Dual-use Transfers, 17:30766 (R;XA)

IAEA inspections and Iraq's nuclear capabilities, 17:30767 (I;XA)

Reactor pressure vessel embrittlement: Report of the IAEA extrabudgetary programme on the safety of WWER-440 model 230 nuclear power plants, 17:30891 (R;XA)

Review of available options for low level radioactive waste disposal, 17:30701 (R;XA)

International Centre for Theoretical Physics, Trieste (Italy)

A remark on the unitary part of contractions, 17:32075 (R;XA)

A theoretical kinematical study of the gradient of any cosmic scalar field, 17:32074 (R;XA)

Abelian gauge theories on homogeneous spaces, 17:32090 (R;XA)

Beltrami parametrization and gauging of Virasoro and w-infinity algebras, 17:32078 (R;XA)

Bifurcations and chaos in dislocation multiplication process, 17:31229 (R;XA)

Chiral Schwinger model at finite temperature, 17:32088 (R;XA)

Coherent decay of positronium bose condensate, 17:32362 (R;XA)

Compensating fields and anomalies in supergravity, 17:32080 (R;XA)

Detection of charged Higgs bosons through the rare decay $H^+ \to W^+\gamma$, 17:32190 (R;XA)

Dielectric and magnetic permittivities of the QED vacuum caused by dyon, 17:32133 (R;XA)

Differential inclusions governed by convex and nonconvex perturbation of a sweeping process, 17:32021 (R;XA)

Existence of viable solutions for nonconvex-valued differential inclusions in Banach spaces, 17:32022 (R;XA)

Fourth-rank gravity and cosmology, 17:32077 (R;XA)

General scalar-tensor theories for induced gravity inflation, 17:32081 (R;XA)

Hadron nucleon interactions in view of a multi-peripheral model, 17:32157 (R;XA)

More on the radiation reaction and runaway solutions in classical electrodynamics, 17:32087 (R;XA)

Non-commutative differential geometry: 1. Geometrical symplectic formulation of classical mechanics, 17:32023 (R;XA)

Nonclassical disordered phase in the strong quantum limit of frustrated antiferromagnets, 17:32389 (R;XA)
Nonlinear realisations of $\omega_{1+\infty}$, 17:32076 (R;XA)
Normal equivariant forms of vector fields, 17:32086 (R;XA;In French)
Nth roots of normal contractions, 17:32082 (R;XA)
On one-dimensional topological and conformal field theories, 17:32084 (R;XA)
Quantum group generalization of the heterotic QFT, 17:32085 (R;XA)
Remarks on the additional symmetries and W-constraints in the generalized KdV hierarchy, 17:32089 (R;XA)
Time-translation noninvariance of temporal gauge propagator, 17:32079 (R;XA)
Topological properties of the solution sets to differential inclusions of evolution type, 17:32083 (R;XA)
Weak probes and the Gottfried sum rule, 17:32134 (R;XA)

International Fuel Cells Corp., South Windsor, CT (United States)
Advanced water-cooled phosphoric acid fuel cell development, 17:31082 (R;US)

International Technology Corp., Denver, CO (United States)
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)

Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, June 1, 1991–August 31, 1991, 17:30465 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, January 1, 1991–March 31, 1991, 17:30466 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, October 1, 1990–December 31, 1990, 17:30467 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH and -SH functions: Quarterly report, January 1, 1990–March 31, 1990, 17:30468 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Final technical report, 17:30469 (R;US)

Israel Atomic Energy Commission, Beersheba (Israel). Nuclear Research Center-Negev
Estimation of population expected exposure as a result of mining in Sde Zohar field, 17:31665 (R;IL;In Hebrew)
Industrial radiography, 17:30791 (R;IL;In Hebrew)

Israel Atomic Energy Commission, Yavne (Israel). Soreq Nuclear Research Center
Annual meeting of the Israel Geological Society, 1991, 17:32012 (I;IL)
Measurement system of 'free' radon in rocks, 17:31700 (IA;IL)

Israel Geological Society, Jerusalem (Israel)
^{36}Cl in rainwater in Israel, 17:31704 (IA;IL)
A reevaluation of the lake sediment chronology in the Dead Sea basin based on new ^{230}Th/U dates, 17:31702 (IA;IL)
Annual meeting of the Israel Geological Society, 1991, 17:32012 (I;IL)
Annual meeting of the Israel Geological Society, 1989, 17:32013 (I;IL)
Ar-Ar age measurements on clay minerals from the Paleozoic section in southern Israel, 17:31703 (IA;IL)
Boron isotope geochemistry in the terrestrial environment, 17:31715 (IA;IL)
Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments, 17:31706 (IA;IL)
Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee, 17:31712 (IA;IL)
Diagenesis of Inmar Formation, southern Israel: Stable isotope studies of carbonate minerals, 17:31701 (IA;IL)
Evidence for the origin of Ca in land snails living on basalts (Golan Heights) from their strontium isotopic composition, 17:31714 (IA;IL)
Involvement of fluids in regional metamorphism: A preliminary study of carbonate isotope compositional profiles on Sifnos (Cyclydes, Greece), 17:31711 (IA;IL)
K-Ar ages of the volcanism, southwestern Syria (the Muvlaat region), 17:31713 (IA;IL)
K-Ar measurements in the Hatrurim formation, Arad area, 17:31709 (IA;IL)
Measurement system of 'free' radon in rocks, 17:31700 (IA;IL)
Radon in rock units in the Negev, Israel, 17:31710 (IA;IL)
Sr and Nd isotopic constraints on the evolution of the Har Timna igneous complex, southern Israel, 17:31707 (IA;IL)
Stable isotope geochemistry of dike/Inmar sandstone contact zones, Makhtesh Ramon, Israel, 17:31708 (IA;IL)
The isotopic composition of strontium in Israeli rains, 17:31705 (IA;IL)

Israel Radiation Protection Association (Israel)
Carcinogenic risks from exposure to non-ionizing radiation: Updated in accordance with the latest findings of the commitees ICRP, BEIR and UNSCEAR, 17:31925 (RA;IL;In Hebrew)
New developments in personal dosimetry, 17:31930 (RA;IL;In Hebrew)
Patients protection during diagnosis and therapy with ionizing radiation: ICRO recommendations, 17:31929 (RA;IL;In Hebrew)
Radiation safety in Israel: Thoughts and expectations, 17:32578 (RA;IL;In Hebrew)
Radon - its concentrations and hazards in the world and in Israel, 17:31928 (RA;IL;In Hebrew)
Risk assessment - benefit in scanning medical examination for early detection of breast cancer by means of mammography, 17:31927 (RA;IL;In Hebrew)
Supervising radiation protection in Israel: A new arrangement, 17:32577 (RA;IL;In Hebrew)
Symposium dedicated to actual problems in radiation safety, 17:31924 (R;IL;In Hebrew)
The biological effects of exposure to RF radiation, 17:31926 (RA;IL;In Hebrew)
The environmental effects of the nuclear accidents in Chernobylsk (1986) and in the Ural mountains, 17:30965 (RA;IL;In Hebrew)

J

Jaakko Poeyry Oy, Helsinki (Finland)
Emissions of nitrogen oxides in Finland in the 1980s and 1990s, 17:31682 (R;FI;In Finnish)

Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan)
Proceedings of the specialists' meeting on high energy nuclear data, 17:32211 (R;US)

Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Dept. of Physics
Polarized proton induced breakup of ^{12}C at 16 MeV, 17:32322 (R;JP)

Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Japanese Nuclear Data Committee
Proceedings of the 1991 symposium on nuclear data, 17:32210 (R;JP)

Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Tokai Research Establishment
JENDL Dosimetry File, 17:32320 (R;JP)
Measurement of formation cross sections of short-lived nuclei by 14 MeV neutrons–F, Mg, Si, Ti, Cr, Ni, Ga, Rb, Sr, Ag, 17:32321 (R;JP)

Japan Atomic Energy Research Inst., Tokyo (Japan)
A comparison of the predictions of the INSPECT reaction set with experimental data, 17:30894 (RA;JP)
A new chemical model for the removal of iodine vapour from a reactor containment by aqueous sprays, 17:30876 (RA;JP)
A research on applications of qualitative reasoning techniques in Human Acts Simulation Program, 17:31359 (R;JP)
ACE bench-scale studies of iodine volatility and interaction with epoxy painted surfaces, 17:31338 (RA;JP)
Activities of the Commission of the European Communities in the area of iodine chemistry in severe reactor accidents, 17:30871 (RA;JP)

Advanced Containment Experiments (ACE): Evaluation of pre-test code calculations of iodine behaviour in the Radioiodine Test Facility, 17:31341 (RA;JP)

An examination on the determination precision of uranium content in the HTGR fuel compacts, 17:30991 (R;JP;In Japanese)

Analysis of iodine source term from a small BWR during a postulated severe accident using IMPAIR 2/M code, 17:30875 (RA;JP)

Annual progress report on the NSRR experiments, 20: January 1988 through March 1989, 17:30992 (R;JP;In Japanese)

Aqueous solution of iodide under gamma ray irradiation: Fixation of iodide by adding soluble silver salt, 17:31335 (RA;JP)

Batch-type tests on formations of volatile iodine species from aqueous iodide solution under ^{60}Co γ-rays irradiation, 17:31336 (RA;JP)

Comparison between a steady-state fusion reactor and an inductively driven pulse reactor, 17:32463 (R;JP)

Comparison of double-differential neutron emission cross sections calculated from evaluated nuclear data libraries with experimental data, 17:32462 (R;US)

Construction and operating performance of apparatus for rotating irradiation fiber curing, 17:30790 (R;JP;In Japanese)

Design of JAERI Gyrotron Test Facility, 17:32461 (R;JP;In Japanese)

Effect of boiling upon radiolysis of iodide solution, 17:31326 (RA;JP)

Improvement and validation of tellurium transport models in the RAFT code, 17:30946 (RA;JP)

International Atomic Energy Agency co-operated research programme on the safety assessment of near-surface radioactive waste disposal facilities (NSARS): Results for Test Case 1 (earth trench case), 17:30702 (R;JP)

Investigation on the gas-phase radiolysis of metal complexes, 17:31328 (R;JP;In Japanese)

Iodine chemical form in LWR reactor accidents: Regulatory perspectives in the United States, 17:30919 (RA;JP)

Iodine chemical forms in LWR severe accidents, 17:30874 (RA;JP)

Iodine chemistry in Falcon, 17:30893 (RA;JP)

Iodine chemistry in the presence of vinyl surfaces, 17:30944 (RA;JP)

Japanese contribution of ITER PF systems design during CDA, 17:32460 (R;JP)

Large-scale experiments on iodine release associated with coolant flashing due to ruptured high-pressure tubes, 17:30945 (RA;JP)

Measurement on the rate of some reactions relevant to iodine chemistry in the aqueous phase, 17:31327 (RA;JP)

Modelling of iodine chemistry: The LIRIC database, 17:32574 (RA;JP)

Numerical analysis of gas puff modulation experiment on JT-60U, 17:32428 (R;JP)

Overview of severe accident research in Japan, 17:31012 (RA;JP)

Overview of the ACF iodine project, 17:31013 (RA;JP)

Performances of models for predicting mercury concentrations in fresh-water fish after chronic releases into rivers: Applications to a test scenario of the BIOMOVS study, 17:31754 (R;JP)

Pre-pulse irradiation examination, NSRR pulse irradiation and post-pulse irradiation examination of MH-2 fuel rod, 17:30896 (R;JP;In Japanese, English)

Proceedings of the international conference on evolution in beam applications, 17:30789 (I;JP)

Reassessment of fuel failure behavior in the SPERT and PBF experiments for irradiated fuel rods under reactivity initiated accident conditions, 17:30953 (R;JP;In Japanese)

Studies on formation and transport of volatile iodine species in radiation field, 17:31325 (RA;JP)

The ace large scale iodine experiment at the Containment Systems Test Facility (CSTF), 17:31015 (RA;JP)

The Advanced Containment Experiments (ACE) Radioiodine Test Facility experimental program, 17:31339 (RA;JP)

The Canadian programme on iodine chemistry in reactor safety, 17:31014 (RA;JP)

The effects of zinc primer surfaces on iodine behaviour within containment, 17:30943 (RA;JP)

The kinetic behaviour of iodine and cesium under severe accident conditions, 17:31342 (RA;JP)

The kinetics of reaction between iodine vapour and bulk-material aerosols, 17:30872 (RA;JP)

The modelling of iodine behavior for assessing the radiological consequences of a design basis accident, 17:30895 (RA;JP)

The oxidation of cesium iodine aerosols during hydrogen combustion, 17:31340 (RA;JP)

Two-phase flow characteristics analysis code: MINCS, 17:31394 (R;JP)

Validation of IMPAIR 2 code using ACE-test results from the Radioiodine Test Facility (RTF), 17:32551 (RA;JP)

Validation of the IODE code on analytical experiments, 17:30873 (RA;JP)

Volatile organic iodine formation by surface processes, 17:31337 (RA;JP)

Jersey Nuclear Co., Richland, WA (United States)

LEOPARDSPOTS: Spectrum calc with depletion, 17:32534 (CM;US)

Jet Process Corp., New Haven, CT (United States)

Jet vapor deposition of thin films for solid oxide and other fuel cell applications, 17:31081 (R;US)

Johns Hopkins Univ., Baltimore, MD (United States). School of Medicine

Synthesis of tracers using automated radiochemistry and robotics: Progress report, April 1, 1992–July 31, 1992, 17:31331 (R;US)

Joint FAO/IAEA Div. of Nuclear Techniques in Food and Agriculture, Vienna (Austria)

Animal production and health newsletter. No 16, 17:31865 (I;XA)

Detection of cells infected by Thailand strains of pseudorabies virus using a specific DNA probe, 17:31861 (RA;XA)

Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990, 17:31860 (R;XA)

Serological studies on bovine leukemia virus (BLV) infection in Costa Rica by ELISA, immunodiffusion and Western blot tests, 17:31863 (RA;XA)

Soils newsletter. V. 15, no. 1, 17:31866 (I;XA)

The use of ELISA and nucleic acid hybridization tests in research and diagnosis of bovine leukosis virus, 17:31862 (RA;XA)

Joint Inst. for Nuclear Research, Dubna (Russian Federation)

A possible interpretation of anomalous behaviour of proton spectrum at 0 deg from deuteron fragmentation at 9 GeV/c, 17:32330 (RA;SU;In Russian)

AET and MEA affect on chromosomal aberrations occurrence in root meristems under γ-irradiation of plants within wide dose range from stimulatory up to superlethal doses, 17:31980 (RA;SU;In Russian)

Calculation of ion charge-state distributions in ECR ion sources, 17:31490 (R;SU;In Russian)

Clusters in the nuclear model of chiral field solitons, 17:32235 (RA;SU)

Comparative aspects of carcinogenic effects caused by protons, helium ions and γ-radiation, 17:31981 (RA;SU;In Russian)

Comparative study of qualitative cytogenetic effects induced by fractionated γ-neutron irradiation in man lymphocytes at G_0 and G_1 stages, 17:31970 (RA;SU;In Russian)

Cytogenetics of radiation-induced adaptation in man lymphocytes, 17:31973 (RA;SU;In Russian)

Damping of resistive instability in UNK-1 with digital electronics in feedback, 17:31536 (R;SU;In Russian)

Effect of durable γ-radiation on E.Coli, 17:31963 (RA;SU;In Russian)

Effect of millimeter radiation on radiationinduced repair of genome conformation state, 17:31957 (IA;SU;In Russian)

Electrical transparency of grids used in gaseous particle detectors, 17:31571 (RA;SU)

Evolutionary regularities formation of hierarchic system of genome reliability, 17:31979 (RA;SU;In Russian)

Genetic effects of charged particles: Proceedings of conference, 17:31959 (R;SU)

Induction of SOS-system in E.Coli under γ-irradiation in the presence of anoxic sensitizer TAN, 17:31964 (RA;SU;In Russian)

JINR rapid communications: Collection, 17:31570 (R;SU)

Kinetics of formation of induced mutants of Saccharomyces cerevisiae, 17:31966 (RA;SU;In Russian)

Low dose radiation effects: a holistic model, 17:31960 (RA;SU)
Microdosimetrical calculations of the rate of repairable DNA - double strand breaks based on a model for the interpretation of experiments with different doses and radiation qualities, 17:31967 (RA;SU)
Modification of γ-induced mutagenesis in Ames test-strains: 1. Radioprotector effect on mutagenesis in Salmonella typhimurium, 17:31961 (RA;SU;In Russian)
Modification of γ-induced mutagenesis in Ames test-strains: 2. TAN effect on Salmonella typhimurium mutagenesis, 17:31962 (RA;SU;In Russian)
Modification of primary radiation injuries of biological systems by into compounds, 17:31978 (RA;SU;In Russian)
Modifying influence of DNA synthesis inhibitors on the effect of irradiation of Chinese hamster cells, 17:31968 (RA;SU)
Multiquark stable and metastable states, 17:32329 (RA;SU)
New type of radiation aftereffect: study of life span in generations of irradiated drosophila, 17:31976 (RA;SU;In Russian)
On the check-up of the violation of the relativity principle by the investigation of the local properties of spin precession of relativistic electrons conducted at the storage ring, 17:31531 (R;SU;In Russian)
Photoreactivation of γ-induced premutations damages in Drosophila wild and phr$^-$ genotypes, 17:31977 (RA;SU;In Russian)
Post-irradiation DNA degradation in certain repair-deficient E.Coli strains, 17:31965 (RA;SU)
Postradiation recovery and radioresistance of seeds, 17:31958 (IA;SU;In Russian)
Radiosensitivity of L5178Y mice lymphoma cells and state of antioxidant enzyme system, 17:31971 (RA;SU;In Russian)
Regularities of DNA synthesis repair in populations of irradiated mammalian cells, 17:31969 (RA;SU;In Russian)
Simulation and depression of repair in mutagenesis of Drosophila: adaptive response and heavy ion effect, 17:31975 (RA;SU)
Study of characteristics of flat scintillation detectors with a fiber optics light guide for the multilayer charged-particle ΔE-spectrometer, 17:31572 (RA;SU;In Russian)
The stability of the damper system for the coherent transverse oscillations of the beam in a synchrotron, 17:31458 (R;SU;In Russian)
The z-transform application for solving the problem of free beam oscillation damping in the accelerator, 17:31456 (R;SU;In Russian)
Theoretical treatment of a classical transverse feedback system using Z-transform, 17:31455 (R;SU)
To the problem of DNA-target for radiation-induced exchange chromosomal aberrations, 17:31974 (RA;SU;In Russian)
X-radiation and hydrogen peroxide induce adaptation of lymphocytes of man peripheral blood to subsequent x-irradiation, 17:31972 (RA;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Dept. of Radiation Safety
Data bank of individual dosimtry control in the JINR, 17:31956 (R;SU;In Russian)
Double differential neutron and proton productions cross sections in nucleus-nucleus collisions, 17:32335 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation
A numerical solution of the two-center problem, 17:32038 (R;SU;In Russian)
A possible interpretation of anomalous behaviour of proton spectrum at 0 deg from deuteron fragmentation at 9 GeV/c, 17:32330 (RA;SU;In Russian)
Algorithm and program for solution of the Sturm-Liouville problem using the high order accuracy spline scheme, 17:32553 (R;SU;In Russian)
Algorithm for the solution of the Faddeev equation for a system of three identical spinless particles, 17:32034 (R;SU;In Russian)
Algorithm of numerical calculations of differential Yakubovsky equations for the (1+3) scattering problem, 17:32035 (R;SU;In Russian)
Analysis of field space distribution of a spectrometric magnet, 17:31617 (R;SU;In Russian)
Computation of Green function of the Schroedinger-like partial differential equations by the numerical functional integration, 17:32552 (R;SU)
Evaluation of the high energy proton accumulation effect in the geomagnetic field by the mapping method, 17:32051 (R;SU;In Russian)
Newtonian iterative scheme for solving Schwinger-Dyson equation for a quark, 17:32145 (R;SU)
Numerical method of solution of a boundary value problem for the coupled integro-differential equations (The Bethe-Salpeter equation), 17:32037 (R;SU;In Russian)
On a modification of a continuous analog of the Newton method, 17:32036 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy
Calculations of a two-dimensional pulsed magnetic field of an emulsion detector coil by the combined method, 17:31574 (R;SU;In Russian)
Charge exchange $^7Li \to {}^7Be$ cross sections at 21 GeV/c on H,C,Al,Cu, Pb nuclei, 17:32331 (R;SU;In Russian)
Charge-exchange cross sections of the $^3H \to {}^3He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)
Hadrons in statu nascendi, 17:32323 (R;SU)
Investigation of two-track resolution efficiency of the VKD vertex detector using simulation of p-barp interactions at 6 TeV, 17:31573 (R;SU;In Russian)
Multichannel recorder of transition processes in superconducting magnets, 17:31488 (R;SU;In Russian)
Multiquark stable and metastable states, 17:32329 (RA;SU)
Radio-frequency linear ion accelerator (proposal for development of the acceleration for ion beam implantation), 17:31437 (R;SU;In Russian)
Relativity theory in (2+2)-space, 17:32030 (R;SU)
Simulation of one-turn system of initial betatron beam oscillations for UNK I stage, 17:31535 (R;SU;In Russian)
Some problems of relativistic electrodynamics, 17:32106 (R;SU)
Study of characteristics of flat scintillation detectors with a fiber optics light guide for the multilayer charged-particle ΔE-spectrometer, 17:31572 (RA;SU;In Russian)
Systems for study on spatial beam characteristics based on CCD, 17:31459 (R;SU;In Russian)
Triggering system for relativistic hypernuclei detection, 17:31575 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics
A system for experiments automation on the neutron diffractometer DN-2 at the pulsed reactor IBR-2, 17:31578 (R;SU;In Russian)
Calculation of a variant of the 'inelastic' adiabatic spin-flipper for cold neutrons, 17:32346 (R;SU;In Russian)
Generalization of Schroedinger equation to the Boltzmann phase space, 17:32039 (R;SU;In Russian)
Hardware for research of transition processes in condensed matter with neutron diffraction method, 17:31616 (R;SU;In Russian)
Measurement of the cross section of the $^{36}Ar(n,\alpha)^{33}S$ and $^{50}V(n,p)^{50}Ti$ reactions induced by thermal neutrons, 17:32333 (R;SU;In Russian)
On different values of the neutron-electron scattering amplitude and neutron mean square charge radius obtained from the low-energy dependence of the scattering amplitude, 17:32325 (R;SU)
To the problem of anomalous radiative proton capture in thick carbon targets, 17:32334 (R;SU;In Russian)
VKP-6 programmed time-to-digital converter with additional functions, 17:31412 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems
Accelerating system simulation of U-200T isochronous cyclotron, 17:31436 (R;SU;In Russian)
Analysis of data from the HYPERON facility in experimental investigation of the inclusive production of K^0 and $K^{*0}(892)$ mesons, 17:31577 (R;SU;In Russian)
Calculation of the beam extraction system from the U-120K cyclotron, 17:31489 (R;SU;In Russian)

Convertion project of the AS UzSSR cyclotron, 17:31435 (R;SU;In Russian)
Correlation experiments on checking the existence of low temperature nuclear fusion in titanium and zirconium deuterides, 17:32429 (R;SU)
Determination of the synchronous phase in a phasotron, 17:31457 (R;SU;In Russian)
Direct current transducer, 17:31618 (R;SU;In Russian)
Electrical transparency of grids used in gaseous particle detectors, 17:31571 (RA;SU)
Energy division and hadron transverse momenta in the quark-gluon strings model, 17:32111 (R;SU)
Experimental observation of neutron emission insaturation of titanium chips with gaseous deuterium, 17:32431 (R;SU)
Geometry choice and calculation of the U-200T isochronous cyclotron accelerating system, 17:31491 (R;SU;In Russian)
Hadronization of highly virtual quarks in nuclei, 17:32233 (R;SU)
Hall-effect device of high accuracy, 17:31619 (R;SU;In Russian)
Inverse meso-optics and its potential applications, 17:31569 (R;SU)
Investigation of β-ν angular correlation in decay of ^{24}Na nuclei, 17:32249 (R;SU)
Investigation of hydrogen permeability of protective coating for high-temperature alloy EI698, 17:31232 (R;SU;In Russian)
JINR rapid communications: Collection, 17:31570 (R;SU)
JINR Tau-charm factory design considerations, 17:31533 (R;SU)
Neutron spectra in the energy range from 10^{-8} to hundreds of MeV measurement in hard scattered radiation fields, 17:32347 (R;SU;In Russian)
Observation of neutron bursts in saturation of titanium with deuterium by means of D_2O electrolysis, 17:32430 (R;SU)
On the problem of enhancement of neutrino oscillation in matter, 17:32165 (R;SU)
On-line system for selection and measurement of currents in magnetic elements of beam lines at the JINR phasotron, 17:31434 (R;SU;In Russian)
Quantum effects and colour transparency in charmonium photoproduction on nuclei, 17:32324 (R;SU)
Resonance amplification of the nuclear reaction X(a,b)Y near the a+X channel threshold, 17:32327 (R;SU)
The effect of the anoxic radiosensitizing agent Tan on induction of revertants by γ-rays and helium ions in salmonella tester strains, 17:31982 (R;SU)
The system of standard currents, 17:31493 (R;SU;In Russian)
The technique for measuring of the dip angle of the straight particle tracks in the nuclear emulsion by means of the meso-optical Fourier transform microscope, 17:31567 (R;SU;In Russian)
Upgrading of the stabilized direct-current power supply unit for the main winding of the iron-current channel at the JINR phasotron, 17:31492 (R;SU;In Russian)
Wide aperture scintillation hodoscope with FEU-85, 17:31568 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions
Concentration of light homologs of superheavy elements in coal combustion, 17:31724 (R;SU;In Russian)
Dissipative particle dynamics in ee-bar storage rings in the presence of linear synchro-betatron coupling, 17:31534 (R;SU)
Electrochemical etching of fission fragment tracks in dielectric detectors for use in chemical experiments with transplutonium elements, 17:31302 (R;SU;In Russian)
Investigation of soft errors in VLCIC RAM under influence of heavy ions, 17:31604 (R;SU;In Russian)
Linear synchro-betatron resonances, driven by beam-beam interaction, 17:31532 (R;SU)
Multielemental gamma activation analysis of copper-molybdenum ores and its production of processing using microtron, 17:31301 (R;SU;In Russian)
New mass measurements of neutron-rich nuclei near N=20*, 17:32234 (R;SU)
Setup for separation and investigation of β-n decay of neutron-rich nuclei, 17:31576 (R;SU;In Russian)
The experimental setup for optical spectra measurements with a pulsed laser, 17:31579 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics
'Schroedinger equations' of higher (>2) order, 17:32033 (R;SU;In Russian)
A new exact solution to the classical equations of motion of the relativistic string with massive ends, 17:32104 (R;SU)
Analysis of $\pi\pi$ scattering with taking account of the KK-bar abd $\eta\eta$ thresholds, 17:32166 (R;SU;In Russian)
Calculation of the Higgs boson decay widths into boson pairs, 17:32146 (R;SU;In Russian)
Clusters in the nuclear model of chiral field solitons, 17:32235 (RA;SU)
Description of the Gamow-Teller β^+-decays and (n,p) transitions in spherical nuclei, 17:32250 (R;SU)
Gottfried sum rule and mesonic exchanges in deuteron, 17:32112 (R;SU)
H^+H^- interaction up to higher orders of perturbation theory in the model with two Higgs doublets (self-energy and vertex diagrams), 17:32194 (R;SU)
H^+H^- interaction up to higher orders of perturbation theory in the model with two Higgs doublets (Lagrangian and one-loop amplitudes), 17:32142 (R;SU)
Hadronization of QCD, 17:32143 (R;SU)
Intermittency in the limit of a large number of correlated components, 17:32032 (R;SU;In Russian)
Invariant structures and static forces in gauge theories, 17:32109 (R;SU)
Invariant structures in gauge theories and confinement, 17:32107 (R;SU)
Inverse pion electroproduction at high energies- a source of information on the hadron form factors, 17:32196 (R;SU)
Mechanism of enhanced yield of light particles in compound nucleus formation: diffusion description, 17:32328 (R;SU)
Off-shell effects in the dynamical model of pion photoproduction on nucleon, 17:32326 (R;SU)
On a method of solution of dispersion equations for low-energy pion-pion scattering, 17:32167 (R;SU;In Russian)
On classical electrodynamics with distribution-valued sources, 17:32110 (R;SU)
On the energy-momentum tensors for field theories in spaces with affine connection and metric: Generalized Bianchi identities and different energy-momentum tensors, 17:32102 (R;SU)
On the energy-momentum tensors for field theories in spaces with affine connection and metric: Conditions for existence of energy-momentum tensors, 17:32103 (R;SU)
On the invariant measure for the nonlinear Schroedinger equation, 17:32031 (R;SU)
Parameters of low-energy physics, radial excitations of π, K, D mesons and QCD potential, 17:32144 (R;SU)
Parasupersymmetric spinning particle and topological gauge fields, 17:32105 (R;SU)
Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)
Quantum discrete gauge models with bosonic and fermionic degrees of freedom, 17:32108 (R;SU)
Some new aspects of the unitary and analytic VMD model for electromagnetic structure of hadrons, 17:32195 (R;SU)
The isoscalar 4^- and 5^- giant resonances in spherical nuclei, 17:32236 (R;SU;In Russian)
The system whose Hamiltonian is a time-dependent quadratic form in coordinates and momenta, 17:32101 (R;SU)

K

Karlsruhe Univ. (T.H.) (Germany). Fakultaet fuer Chemie
Quantitative determination of elements and identification of compounds of alkali halides by depth-sensitive secondary neutral mass spectrometry, 17:31303 (R;DE;In German)

Kent State Univ., OH (United States). Dept. of Physics
Heavy-ion collisions and the nuclear equation of state: Progress report, August 15, 1991–March 1992, 17:32281 (R;US)

Kentucky Univ., Lexington, KY (United States). Research Foundation
Progress performance report of clean uses of fossil fuels, 17:32482 (R;US)

Kernforschungszentrum Karlsruhe GmbH (Germany)
Program budget 1992 of the Karlsruhe Nuclear Research Center. As of November 19, 1991, 17:32491 (I;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Hauptabteilung Ingenieurtechnik
Experiments to study the erosive effect of oxide casting streams on structures, 17:31234 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Kernphysik
Methods reducing doppler broadening in laserspectroscopy of stored ions and the isotope shifts of hafnium, 17:32356 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Radiochemie
Quantitative determination of elements and identification of compounds of alkali halides by depth-sensitive secondary neutral mass spectrometry, 17:31303 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Reaktorsicherheit
The three-dimensional transient two-phase flow computer programme BACCHUS-3D/TP, 17:31395 (R;DE)

Kernforschungszentrum Karlsruhe GmbH (Germany). Lab. fuer Isotopentechnik
KfK Laboratory for Isotope Technology. Progress report on research and development activities in 1991, 17:32483 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung
Experiments to study the erosive effect of oxide casting streams on structures, 17:31234 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Schadstoffbeherrschung in der Umwelt (PSU)
Quantitative determination of elements and identification of compounds of alkali halides by depth-sensitive secondary neutral mass spectrometry, 17:31303 (R;DE;In German)

Kernkraftwerk Lingen GmbH (Germany)
Kernkraftwerk Lingen GmbH: Safe enclosure. Annual report 1991, 17:30870 (I;DE;In German)

Krall Associates, Del Mar, CA (United States)
Annual performance report for "A program of FRC theory research", 17:32448 (R;US)

Krarup (N.), Copenhagen (Denmark)
Analysis of advantages to be gained by users through utilizing SAFECOM CL computers in lorries, 17:31121 (I;DK;In Danish)
LASTCOMP - electronic data processing for transportation by lorries: Final report, 17:31120 (I;DK;In Danish)
LASTCOMP - electronic data processing for transportation by lorries, 17:31122 (I;DK;In Danish)

KVM, the Joint Committee of Power and Heating Producers on Environmental Issues, Stockholm (Sweden)
The environmental year 1991, 17:31643 (R;SE;In Swedish)

L

Laboratoire National Saturne - Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)
η,$K_L \rightarrow \pi^+\pi^-\gamma$ as tests of chiral models, 17:32177 (R;FR)
A numerical method for the ray-tracing of polarized beams, 17:31451 (R;FR)
Comparison of computational methods and results concerning the simulation of IH structures with the codes LORAS and DYNAC, 17:31452 (R;FR)
Dione status report, 17:32275 (R;FR)
Electroproduction of polarized Λ's, 17:32187 (R;FR)
Helical siberian snake, 17:31450 (R;FR;In French)
Spin observables in the $pp \rightarrow pK^+Y$ reactions at Saturne, 17:32154 (R;FR)
Strangeness production in the $pp \rightarrow pK^+Y$ and $pA \rightarrow pK^+X$ reactions at Saturne, 17:32153 (R;FR)

Lawrence Berkeley Lab., CA (United States)
14th international symposium on molecular beams, 17:32379 (R;US)
A pore-level scenario for the development of mixed-wettability in oil reservoirs, 17:30571 (R;US)
Inclusive charged hadron and K^0 production in two-photon interactions, 17:32181 (R;US)
Quantum theory and the emergence of patterns in the universe, 17:32042 (R;US)
Using a straightness reference in obtaining more accurate surface profiles from a Long Trace Profiler, 17:31516 (R;US)

Lawrence Livermore National Lab., CA (United States)
A computer simulation of ecosystem processes in forests for application to air pollution, acid precipitation and global change, 17:31674 (R;US)
A correlated K-distribution model of the heating rates for CH_4 and N_2O in the atmosphere between 0 and 60 km, 17:31676 (R;US)
A design for an advanced divertor for DIII-D and ITER: The radiative slot divertor, 17:32474 (R;US)
A finite element/finite difference approach for modeling three-dimensional flow and pollutant dispersion around structures, 17:31673 (R;US)
A lossless one-pass sorting algorithm for symmetric three-dimensional gamma-ray data sets, 17:31601 (R;US)
A system for destroying mixed and hazardous wastes with no gas or liquid effluents, 17:30737 (R;US)
Access control issues and solutions for large sites, 17:30778 (R;US)
Active tectonics of the south Caspian basin and surrounding regions, 17:32017 (RA;US)
Aerogels, emulsions, and composites: Controlling structure with organic sol-gel chemistry, 17:31282 (R;US)
Alternate electrode materials for the SP100 reactor: Final report, 17:31263 (R;US)
An integrated methodology for sabotage vulnerability assessment, 17:30777 (R;US)
Analysis of collective resonances in clusters: Metals and carbon, 17:32367 (R;US)
Aqueous phase oxidation techniques as an alternative to incineration, 17:31322 (R;US)
C_{60} transformations at high pressures, 17:31283 (R;US)
Chemistry and Materials Science progress report, first half FY 1992: Weapons-Supporting Research and Laboratory Directed Research and Development, 17:31243 (R;US)
Combustion synthesis method and products, 17:31261 (PA;US)
Comparison of two stochastic models of scalar diffusion in turbulent flow, 17:31677 (R;US)
Construction of large-scale simulation codes using ALPAL: Generation of a hydrodynamics code module, 17:32565 (R;US)
DATA: How to generate, store, retrieve, communicate, and interpret it: Proceedings, 17:32510 (R;US)
Demonstration of a neon-like rubidium x-ray laser, 17:31424 (R;US)
Dense-gas dispersion advection-diffusion model, 17:31675 (R;US)
Determination of the permeability of carbon aerogels by gas flow measurements, 17:31280 (R;US)
Diagnostic of shock wave processes, 17:31366 (R;US)
DIII-D edge physics database, 17:32475 (R;US)
Distributed make (and more), 17:32566 (R;US)
Dynamic multimodal function optimization using genetic algorithms, 17:32567 (R;US)
Electrodialysis and electrohydrolysis applied to Hanford single tank wastes, 17:30736 (R;US)
Energy and Technology Review, April–May 1992, 17:31768 (R;US)
Engineering research, development and technology: Thrust area report FY 91, 17:31346 (R;US)
EQ3/6 V7.0: Geochemical modeling of aqueous systems, 17:32525 (CM;US)
EQ3/6 V7.1: Geochemical modeling of aqueous systems, 17:32526 (CM;US)
Evaluation of actinide volatilities in mixed waste processors, 17:30735 (R;US)
Experimental studies of x-ray laser spectral profiles: Observation of gain narrowing and saturation behavior, 17:31426 (R;US)
Experiments on resonantly photo-pumped x-ray lasers, 17:31423 (R;US)

Flux pinning in oxygen-depleted $YBa_2Cu_3O_{7-y}$ single crystals, 17:31264 (R;US)
Heat transfer in a liquid metal crucible with an integral blackbody cavity, 17:31402 (R;US)
High bandwidth second-harmonic generation in partially deuterated KDP, 17:32477 (R;US)
High frame-rate, large field wavefront sensor, 17:32064 (R;US)
HRS pilot plant and modeling results, 17:30601 (R;US)
Hydrology and Radionuclide Migration Program: 1989 progress report, 17:31746 (R;US)
HYLIFE-2 progress report, 17:32471 (R;US)
Inertial confinement fusion driver enhancements: Final focusing systems and compact heavy-ion driver designs, 17:32472 (R;US)
Laboratory directed research and development FY91: Revision 1, 17:31285 (R;US)
LANSA: A large neutron scintillator array for neutron spectroscopy at Nova, 17:32473 (R;US)
LFK: Livermore FORTRAN kernel computer test, 17:32527 (CM;US)
Measurements of cellular structure in spray detonation, 17:31158 (R;US)
Mechanics of inhomogeneous rock: The two-constituent porous medium paradigm, 17:31281 (R;US)
Mild coal gasification: Product separation, 17:30460 (R;US)
Modeling the dispersion of tracer plumes in the Colorado front range boundary layer during night- and day-time conditions, 17:31678 (R;US)
Nuclear employment policy and optimal exchange strategies, 17:31194 (R;US)
Numerical modelling of the suppression of stimulated Brillouin scattering due to finite laser bandwidth, 17:31420 (R;US)
Oil shale ash-layer thickness and char combustion kinetics, 17:30602 (R;US)
Optical monitor for observing turbulent flow, 17:31612 (PA;US)
Prediction of electromagnetic pulse generation by picosecond avalanches in high-pressure air, 17:31421 (R;US)
Preliminary feasibility and cost analysis of the in-situ microbial filter concept, 17:30734 (R;US)
Preparation, optical and laser properties of Nd-doped sol-gel silica, 17:32476 (R;US)
Radio pill antenna range test, 17:31629 (R;US)
Recent improvements in plutonium gamma-ray analysis using MGA, 17:30776 (R;US)
Recent Nova experimental results, 17:32478 (R;US)
Self-consistent one-dimensional modelling of x-ray laser plasmas, 17:31422 (R;US)
Sensitivities of calculated residual stress to separation distances of two simultaneous events, 17:31641 (R;US)
Silicide layer growth rates in Mo/Si multilayers, 17:31244 (R;US)
Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991, 17:32479 (R;US)
Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
Table-top x-ray lasing based on optical-field-induced ionization, 17:31425 (R;US)
Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project, 17:30669 (R;US)
Temporal scattering and response software users' manual: Version 2.3, 17:32065 (R;US)
The intensity of knock in an internal combustion engine: An experimental and modeling study, 17:31159 (R;US)
The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)
The role of refrigerants in climate change, 17:31679 (R;US)
Total destruction of organic compounds in aqueous wastes by a UV/H_2O_2 process, 17:30738 (R;US)
Utilizing asphaltene pyrolysis to predict pyrolysis kinetics of heavy crude oil and extractable native bitumen, 17:30603 (R;US)
Wastage-resistant FBC evaporator tubing through microalloying, 17:31223 (R;US)

Lehigh Univ., Bethlehem, PA (United States)
Binding and catalytic reduction of NO by transition metal aluminosilicates: Technical progress report, March 1992–May 1992, 17:30483 (R;US)

Lehigh Univ., Bethlehem, PA (United States). Dept. of Chemistry
The effect of selective absorption on coal conversion, October–December 1991, 17:30456 (R;US)

Limoges Univ., 87 (France)
Low temperature sintering of hyperstoichiometric uranium dioxide, 17:30633 (R;FR;In French)

Linkoeping Univ. (Sweden). Dept. of Mechanical Engineering
On fluid power control. With special reference to multiload conditions in load sensing systems, 17:31361 (R;SE)

Los Alamos National Lab., NM (United States)
^{22}Na and ^{26}Al production in nova outbursts, 17:32060 (R;US)
A caution on reliability using "optimal" variance reduction parameters, 17:32349 (R;US)
A distributed timing system for sychronizing control and data correlation, 17:31508 (R;US)
A miniature modular multichannel analyzer system for automated, low- resolution gamma-ray spectroscopy, 17:30760 (R;US)
A preliminary study of the effect of equivalence ratio on a low emissions gas turbine combustor using KIVA-II, 17:30866 (R;US)
A weighted iterative algorithm for neuromagnetic imaging, 17:31850 (R;US)
Advanced high-explosive flux compression generator development: The CN-III series, 17:31636 (R;US)
Analysis of IMS spectra using neural networks, 17:31318 (R;US)
Applications of group-invariant analytic solutions to inertial confinement fusion, 17:32464 (R;US)
Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)
Approximating the r-process on earth with thermonuclear explosions, 17:31637 (R;US)
Are some of the luminous high-latitude stars accretion-powered runaways?, 17:32053 (R;US)
Artificial intelligence and neural networks applied to ion mobility spectrometry, 17:31304 (R;US)
Baryon and lepton number violation in the standard model at high energy, 17:32122 (R;US)
Bipolaronic charge density waves, polaronic spin density waves and high T_c superconductivity, 17:32390 (R;US)
Characterization of radioactive mixed wastes: The industrial perspective, 17:30705 (R;US)
Characterizing laser fusion welded aluminum using synchrotron x-ray microtomography, 17:31406 (R;US)
Commissioning of the Ground Test Accelerator RFQ, 17:31512 (R;US)
Commissioning of the Ground Test Accelerator Intertank Matching Section, 17:31513 (R;US)
Comparison of TORT and THREEDANT on realistic X-Y-Z shielding problems, 17:32350 (R;US)
Comprehensive nuclear model calculations: Introduction to the theory and use of the GNASH code, 17:32269 (R;US)
Cost performance assessment of in situ vitrification, 17:30706 (R;US)
Destruction of explosives and rocket fuels by supercritical water oxidation, 17:31630 (R;US)
Detonation reactions frozen by free expansion and analyzed by mass spectrometry, 17:31631 (R;US)
Development and status of fission-product yield data and applications to calculations of decay properties, 17:32340 (R;US)
Development of XUV projection lithography at 60–80 nm, 17:31413 (R;US)
Dislocation and pores in mullite from diphasic gels, 17:31273 (R;US)
Ductile phase toughening of molybdenum disilicide by low pressure plasma spraying, 17:31258 (R;US)
Dynamical mass estimates in M13, 17:32056 (R;US)
Electron-beam diagnostics development for the Los Alamos FEL facility, 17:31511 (R;US)
Establishing and operating an incident response team, 17:30769 (R;US)
Experimentation and simulation of gravity fed lead castings, 17:31236 (R;US)
Functional MRI studies of human vision on a clinical imager, 17:31849 (R;US)
Geostationary-satellite beacon-receiver array for studies of ionospheric irregularities, 17:32052 (R;US)

- GNETS: Graphical Network Security system user guide, 17:32555 (R;US)
- HIPPI and Fibre Channel, 17:32557 (R;US)
- Image processing and computer controls for video profile diagnostic system in the ground test accelerator (GTA), 17:31506 (R;US)
- Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy, 17:30772 (R;US)
- Industrial applications of hot dry rock geothermal energy, 17:30844 (R;US)
- INF and IAEA: A comparative analysis of verification strategy: [Final report], 17:31197 (R;US)
- Innovative technologies for removing toxic compounds from groundwater and air, 17:31662 (R;US)
- Interchain coupling and 3D modeling of trans-polyacetylene, 17:32361 (R;US)
- International Sherwood fusion theory conference, 17:32402 (R;US)
- Is there a unique effective interaction profile for dislocations?, 17:31235 (R;US)
- LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)
- Linac beam dynamics calculations for low-current large-emittance beams, 17:31461 (R;US)
- Liquid hydrogen flow problems in Kiwi reactors, 17:30915 (R;US)
- Log-ratio beam position monitoring at 425 MHz, 17:31510 (R;US)
- Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations, 17:31259 (R;US)
- Materials compatibility and corrosion issues for accelerator transmutation of waste, 17:30704 (R;US)
- MCFC diagnostics: HCl detection, 17:31079 (R;US)
- Measurement of atomic elastic constants by pulsed neutron powder diffraction, 17:32041 (R;US)
- Measurements of excess heat from a Pons-Fleischmann type electrolytic cell using palladium sheet, 17:32432 (R;US)
- Neutrino mass, 17:32202 (R;US)
- Neutron superfluid dynamics, 17:32057 (R;US)
- New technologies for refrigeration without CFCs, 17:31133 (R;US)
- Nondestructive assays of 55-gallon drums containing uranium and transuranic waste using passive-active shufflers, 17:30709 (R;US)
- Nucleosynthesis in nova explosions, 17:32059 (R;US)
- Processing flowsheet for the accelerator transmutation of waste (ATW) program, 17:30707 (R;US)
- Prospects for the commercial development of hot dry rock geothermal energy in New Mexico, 17:30838 (R;US)
- Quantitative analysis of plutonium and uranium using reversed-phase liquid chromatography and spectrophotometric detection, 17:31305 (R;US)
- Quasielastic scattering using the (p,n) reaction at 795 MeV, 17:32338 (R;US)
- Radioactivities induced in some LDEF samples, 17:32251 (R;US)
- Real-time data archiving for GTA, 17:31507 (R;US)
- Recent advances in the US fission yield and delayed neutron evaluations, 17:32339 (R;US)
- Rf system description for the ground test accelerator radio-frequency quadrupole, 17:31515 (R;US)
- Rf system specifications for a linear accelerator, 17:31514 (R;US)
- Ross Priory workshop presentation, 17:31360 (R;US)
- Safeguards technology and computer security training, 17:30770 (R;US)
- Sample holder for x-ray diffractometry, 17:31600 (PA;US)
- Status and prospects for hot dry rock (HDR) in the United States, 17:30837 (R;US)
- Supercritical CO_2 cleaning for waste minimization, 17:31638 (R;US)
- Suppression of the e^- coextracted from a Penning surface-plasma H^- source, 17:31509 (R;US)
- Tandem betatron, 17:31439 (PA;US)
- The ALEXIS experiment: Current status and performance, 17:32054 (R;US)
- The challenge of performance-based MC&A training for R&D facilities, 17:32484 (R;US)
- The compactness of front tracking for chromatography electrophoresis and incompressible multiphase flow, 17:32365 (R;US)
- The electronic structure of core states under extreme compressions, 17:32364 (R;US)
- The performance realities of massively parallel processors: A case study, 17:32556 (R;US)
- The proton Compton effect: Recent measurements of the electric and magnetic polarizabilities of the proton, 17:32201 (R;US)
- The Strategic Arms Reduction Treaty and its verification: Report No. 12, 17:31192 (R;US)
- The use of ring ratios to detect sample differences in passive neutron counting, 17:30771 (R;US)
- Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)
- Tributary and gap nighttime air flow comparisons, 17:31661 (R;US)
- Ultraviolet studies of novae in the large magellanic cloud, 17:32058 (R;US)
- Uniformity results of the multilayer mirrors used in the ALEXIS ultrasoft x-ray telescopes, 17:32055 (R;US)
- Waste crate counter design, 17:30708 (R;US)

Los Alamos Scientific Lab., NM (United States)

- The in-plant evaluation of a uranium NDA system, 17:30768 (R;US)

Louisiana State Univ., Baton Rouge, LA (United States)

- A physico-chemical study of some areas of fundamental significance to biophysics: Three-year comprehensive report, 1989–1992, 17:31761 (R;US)
- Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988, 17:30544 (R;US)

Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Chemistry

- A physico-chemical study of some areas of fundamental significance to biophysics: Annual report, 1991–1992, 17:31760 (R;US)

Lund Inst. of Tech. (Sweden). Div. of Heat and Power Engineering

- 'Soft' electric heating. Control of resistance heating radiators, 17:31108 (R;SE;In Swedish)

Lund Inst. of Tech. (Sweden). Div. of Thermodynamics, Fluid Mechanics and Heat Transfer

- Experimental evaluation of different parameters importance for the frosting process between plates, 17:31399 (RA;SE;In Swedish)
- Frost formation - A literature study, 17:31397 (RA;SE;In Swedish)
- Frost growth in convection between two plates with one cold side, 17:31398 (RA;SE;In Swedish)
- Theoretical and experimental studies of frost between two plates, 17:31396 (R;SE;In Swedish)

Lund Univ. (Sweden). Dept. of Applied Microbiology

- The fermentation of lignocellulose hydrolysates with xylose isomerases and yeasts, 17:30802 (R;SE)

Lund Univ. (Sweden). Dept. of Chemical Engineering

- Modelling of intraweb heat and mass transfer - a literature review, 17:31134 (R;SE)

Lund Univ. (Sweden). Dept. of Chemical Engineering II, Chemical Center

- Prospects for further development of spray-dry scrubbing, 17:30867 (R;SE)

Lund Univ. (Sweden). Dept. of Ecology

- Soil acidification and element fluxes as related to tree species in deciduous forests of south Sweden, 17:31725 (R;SE)

Lund Univ. (Sweden). Dept. of Heat and Power Engineering

- Reheating of flue gas in small gas-fired condensing boilers, 17:31109 (R;SE;In Swedish)

Lund Univ. (Sweden). Dept. of Industrial Electrical Engineering and Automation

- Optimizing of a photovoltaic system for supplying a residential with electricity, 17:30824 (R;SE)

Lund Univ. (Sweden). Dept. of Machine Design

- Heat insulated tube system for dairying environment, 17:31135 (R;SE)

Lyon-1 Univ., 69 (France)

- Detection of single photons in the L3 experiment, 17:31586 (R;FR;In French)
- Penetration of Hydrogen clusters from 10 to 120 kev/u in carbon foils. Study of their slowing-down and charge distribution of emerging fragments, 17:32341 (R;FR;In French)

Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire

- Detection of single photons in the L3 experiment, 17:31586 (R;FR;In French)

On quantum groups and their potential use in mathematical chemistry, 17:32043 (R;FR)

Penetration of Hydrogen clusters from 10 to 120 kev/u in carbon foils. Study of their slowing-down and charge distribution of emerging fragments, 17:32341 (R;FR;In French)

M

M-C Power Corp., Burr Ridge, IL (United States)

Impact of protective oxides on cathode-side resistances in MCFCs, 17:31085 (R;US)

Marburg Univ. (Germany). Fachgebiet Kernchemie

Investigations concerning the exchange of iodine from non-volatile organic iodine compounds. Final report, 17:30641 (I;DE;In German)

Martin Consulting Services, Inc., Lawrenceville, NJ (United States)

History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants, 17:30897 (R;US)

Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States)

Identifying and building an expert system: The programmer's role, 17:32513 (R;US)

Microwave sintering of multilayer ceramic capacitors, 17:31253 (R;US)

Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States). Center for Natural Phenomena Engineering

White paper on the Hollow Clay Tile Wall Program, 17:31370 (R;US)

Martin Marietta Energy Systems, Inc., Piketon, OH (United States)

Laboratory measurement of miscibility and pressure/temperature relationships of n-C_4F_{10}/CFC-114 mixtures, 17:31319 (R;US)

Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (United States)

Security enhancement subproject: Protected area guard towers: Final environmental assessment, 17:31693 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States)

Coal plasticity at high heating rates and temperatures: First technical progress report for the fourth quarter 1989, 17:30439 (R;US)

Coal plasticity at high heating rates and temperatures: Second technical progress report for the third quarter 1990, 17:30440 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Civil and Environmental Engineering

Colloids in groundwater: Their mobilization, subsurface transport, and sorption affinity for toxic chemicals: Annual technical progress report, 17:31751 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States). Earth Resources Lab.

[In-situ permeability determination and fracture characterization using elastic waves]: Progress report, 17:30562 (R;US)

Massachusetts Univ. Medical Center, Worcester, MA (United States)

^{11}C-thymidine: An in-vivo tracer for cell proliferation, 17:31819 (RA;US)

^{153}Sm-EDTMP and ^{99m}Tc-EDTMP - The radiopharmacology of two potential bone metastasis radiopharmaceuticals, 17:31914 (RA;US)

^{188}Re-EDTMP,, ^{188}Re-MDP, ^{188}Re-DMSA - The radiochemistry and radiopharmacology of the new potentially useful therapeutical agents, 17:31792 (RA;US)

A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG, 17:31838 (RA;US)

A novel bifunctional chelating agent α,ε-N,N′-bis(L-cysteinyl)-L-lysine for radiolabeling of monoclonal antibodies with technetium-99m, 17:31827 (RA;US)

A simple method for producing a technetium-99m-labeled liposome which is stable in vivo, 17:31815 (RA;US)

An animal model for radiopharmaceutical research (Didelphis albiventis) in HM-PAO-Tc-99m use, 17:31843 (RA;US)

Analysis of [F-18]-L-6-fluorodopa and metabolites in plasma for PET studies, 17:31845 (RA;US)

Behavior of various radiochemical species present in Tc-99m labeled monoclonal antibody preparations, 17:31811 (RA;US)

Biological evaluation of selected carbohydrate antibody conjugates, 17:31833 (RA;US)

Clearance curve analysis of extravascularly distributed radiopharmaceuticals, 17:31809 (RA;US)

Comparative loss of In-111 labeled PMN granulocyte from dog, pig and man to cellulose acetate hemodialyzer (HD), 17:31842 (RA;US)

Comparative PMN granulocyte retention of In-111 and Tc-99m HMPAO labeled PMN granulocyte of dogs on cellulose acetate hemodialyzers (HD), 17:31841 (RA;US)

Comparison of methods for incorporating a radioiodinated residualizing cholesteryl ester analog into low density lipoprotein, 17:31812 (RA;US)

Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)

Correlation of lipophilicity to biodistribution of Tc-99m labelled aminothiols, 17:31782 (RA;US)

Coupling of ^{125}I-EGF to serum albumin to stabilize the radioiodine bond: Radiolabeling, purification by HPLC, stability and biodistribution in mice, 17:31829 (RA;US)

Effect of DTPA molecules conjugated to lysine residues on metabolism of I-125 and Tc-99m labeled T101, 17:31806 (RA;US)

Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on platelet kinetics in Beagle dogs: Comparison with In-111 labeled platelets, 17:31913 (RA;US)

Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on ligand exchange and binding with hemoglobin: Comparison with In-111 tropolone, 17:31921 (RA;US)

Elevated brain uptake of ^{59} citrate: Correlation with the critical period of brain development in experimental phenylketonuria, 17:31920 (RA;US)

Enhanced tumor imaging with PokeWeed Mitogen, 17:31820 (RA;US)

Enhancement of liver uptake of a radioiodinated triglyceride analog by prior incorporation into a lipoprotein-like emulsion, 17:31917 (RA;US)

Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts, 17:31804 (RA;US)

Evaluation of metyrapone as a radiotracer for SPECT, 17:31846 (RA;US)

Evaluation of multiple-dose ^{153}Sm-EDTMP for bone pain palliation in cancer patients, 17:31787 (RA;US)

From pure radionuclide species in solution through pure radiopharmaceuticals and simple radiopharmacology to disease-specific nuclear medicine, 17:31810 (RA;US)

$Ga(NO_3)_3$ uptake by human-derived small cell lung cancer cells, 17:31789 (RA;US)

Hepatic uptake of a radiolabeled monoclonal antibody is not receptor-mediated, 17:31803 (RA;US)

I-131 anti-Ama monoclonal antibody for radioimaging of atheromas, 17:31836 (RA;US)

Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated $F(ab')_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8, 17:31832 (RA;US)

Improved localization of tumor with streptavidin and labeled biotin as a substitute for antibody, 17:31830 (RA;US)

In vivo studies of ethanol on prolactin and luteinizing hormone in rats, 17:32003 (RA;US)

In-111-acetylacetone-cyclodextrin inclusion complex: A new form of radiopharmaceutical, 17:31793 (RA;US)

Indium-111 labelled cationic complexes of aminothiols. Structure-activity correlation, 17:31794 (RA;US)

Interaction of triazolam with central type benzodiazepine receptors studied in living baboons using positron emission tomography, 17:31798 (RA;US)

Intratumoral injection of 5-^{125}I-iodo-2′-deoxyuridine in patients with colon cancer, 17:31817 (RA;US)

Intrinsic efficacies of benzodiazepine receptor ligands evaluated in vivo by positron emission tomography in the primate brain, 17:31799 (RA;US)

Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc, 17:31834 (RA;US)
Labeling, control and radiopharmaceutical evaluation of ^{99m}Tc-ADP as tumor seeking agent, 17:31818 (RA;US)
Mapping histone4 mRNA in pig brain with In-111 labeled anti-sense oligo-nucleotide by in-situ hybridization, 17:31801 (RA;US)
Mitochondrial and sarcolemmal membrane potentials determine accumulation of the R and S stereoisomers of the technetium isonitrile complex $Tc(CNCH(CH_2CH_3)CH_2OCH_3)_6^+$, 17:31822 (RA;US)
Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model, 17:31821 (RA;US)
Pertechnetate solutions: Their history and the labelling of HMPAO, 17:31790 (RA;US)
Pharmacokinetics of an anti-CEA antibody radiolabeled with ^{111}In via DTPA and with ^{99m}Tc via two direct labeling methods: A comparison in patients, 17:31831 (RA;US)
Pharmacological properties of lisuride radiolabeled derivatives used for in vivo imaging of D2 dopamine receptors, 17:31796 (RA;US)
Preliminary studies on the metabolism of Tc-99m MAb-170, 17:31805 (RA;US)
Preparation and biodistribution of Tc^{III}-N,N′-ethylenebis (acetylacetone thioiminato) bis (triphenylphosphine) complex, 17:31825 (RA;US)
Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T, 17:31835 (RA;US)
Production of no-carrier added Yttrium-86 for radio-immuno-imaging using positron emission tomography (PET), 17:31844 (RA;US)
Purification of radiolabeled monoclonal antibodies to angiotensin-converting enzyme significantly improves specificity and efficacy of its targeting into the lung, 17:31788 (RA;US)
Quantification of ^{76}Br-bromolisuride binding to central dopamine D2 receptors studied in baboon by PET, 17:31797 (RA;US)
Quantitation of comparative thrombogenicity of dog, pig and human platelets (PLT) in a hemodialyzer (HD), 17:31840 (RA;US)
Quantitation of thrombogenicity of technetium-99M and indium-111 labeled canine platelets (PLT) in a hemodialyzer (HD), 17:31839 (RA;US)
Radioiodinated phospholipid ether analogs as noninvasive tumor imaging agents, 17:31784 (RA;US)
Radiopharmacological studies of ^{99m}Tc-CPI: Experience with isolated rat atrial tissue, 17:31823 (RA;US)
Radiopharmacological studies of a new functionalized isonitrile technetium complex: $[Tc(2\text{-ethoxy-2-methylpropylisonitrile})_6]^+$, 17:31824 (RA;US)
Radiopharmacology of inhaled Xe-133 in skeletal sites containing deposits of Gaucher cells, 17:31795 (RA;US)
Radiopharmacology of new diiodo analogs of calichemicin fragment, 17:31800 (RA;US)
Strategies for pharmacokinetic modeling of monoclonal antibody biodistribution in man, 17:31808 (RA;US)
Structure-activity relationships among nitroimidazole nucleosides used as markers of tissue hypoxia, 17:31915 (RA;US)
Synthesis and evaluation of radioiodinated cholesteryl ethers as lipoprotein probes, 17:31813 (RA;US)
Synthesis and evaluation of technetium-99m monocationic mixed ligand complexes of phenyl substituted/condensed tetradentate Schiff's bases and trimethylphosphine, 17:31780 (RA;US)
Synthesis, pharmacokinetic and clinical studies of ^{131}I-MIBG prepared in Mexico, 17:31837 (RA;US)
Tc^{99m}-LDL as tracer for LDL-receptor mediated processes, 17:31802 (RA;US)
Tc^{99m}-LDL kinetics in the isolated perfused rat liver, 17:31814 (RA;US)
Tc-99m-labeled adriamycin, 17:31781 (RA;US)
Technetium labelled somatostatin a potential agent for in vivo tumor localization, 17:31791 (RA;US)
Technetium-99m biguanide complexes: ^{99m}Tc-1,1-dimethylbiguanide, 17:31826 (RA;US)
The preparation and biodistribution of secondary Tc-HMPAO, 17:31779 (RA;US)
The stability in liver homogenate of In and Y anti-CEA antibody radiolabeled via DTPA and SCN-Bz-DTPA, 17:31807 (RA;US)
Three-step ^{99m}Tc-biotin immunoscintigraphy in the diagnosis of glioma patients, 17:31816 (RA;US)
Tissue distribution and biokinetics of radiolabeled proteins in rats with a focal infection, 17:31918 (RA;US)
Tissue localization of ^{125}I-Triiodothyronine in the periorbital area of mice: A microautoradiographic study, 17:31916 (RA;US)
Tumor-specific Y-90 species in solution for animal and human tumor therapy, 17:31786 (RA;US)
Tumortropic metal-complexes at the crossroads between diagnosis and therapy - A radiopharmacologic reflection, 17:31783 (RA;US)
Uptake of radiolabeled 1-(2-deoxy-2-fluoroarabinofuranosyl)-5-halouracils by experimental tumors in vivo, 17:31785 (RA;US)
[^{35}S] cysteamine and 2-aminoethylisothio uronium bromide hydrobromide: Improved syntheses, biodistributions and implications of protection from radionuclides, 17:31919 (RA;US)

Massachusetts Univ., Amherst, MA (United States). Dept. of Chemical Engineering
Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992, 17:31315 (R;US)

Materials Engineering Associates, Inc., Lanham, MD (United States)
Accelerated irradiation test of gundremmingen reactor vessel trepan material, 17:30878 (R;US)

Michigan Univ., Ann Arbor, MI (United States)
Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)
Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of $Ru_3(CO)_{12}$ (or $RuCl_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)

Mine Safety and Health Administration, Denver, CO (United States)
Injury experience in stone mining, 1990, 17:30604 (R;US)

Ministry of the Environment, Helsinki (Finland). Environmental Protection Dept.
Environmental protection in Finland: National report 1987, 17:31058 (R;FI)
Finnish research project on acidification (HAPRO), 17:31683 (R;FI)
Report on the enforcement of the air pollution control act in the province of central Finland. Part 2: Development trends in pollutant emissions and air quality, pollution control costs, 17:31069 (R;FI;In Finnish)
Research programme for air quality 1986-1990, 17:31681 (R;FI;In Finnish)

Ministry of Trade and Industry, Helsinki (Finland). Energy Dept.
A preliminary study of the energy management system of middle-sized electric utilities, 17:31074 (R;FI;In Finnish)
Energy savings with combination dryer, 17:31136 (R;FI;In Finnish)
LVIS-2000 and ETRR Future building services and energy-efficient buildings and building components: Evaluation of the research programmes 1988-1990, 17:31107 (R;FI)
Remote supervision systems in communes, 17:31114 (R;FI;In Finnish)
Research needs on the natural gas field in Finland, 17:30592 (R;FI;In Finnish)
The analysis of the energy consumption of an industrial building and development of the monitoring, 17:31137 (R;FI;In Finnish)
The energy contents of products and the indirect energy consumption of households, 17:31089 (R;FI;In Finnish)
The utilization of building maintenance feedback in Hepac-design, 17:31113 (R;FI;In Finnish)

Minnesota Mining and Mfg. Co., St. Paul, MN (United States). Optics Technology Center
Process designed for experimentation for increased-caliper Fresnel lenses, 17:30829 (R;US)

Minnesota Univ., Minneapolis, MN (United States). Dept. of Civil and Mineral Engineering
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, June 1, 1991–August 31, 1991, 17:30479 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991, 17:30480 (R;US)

Minnesota Univ., Minneapolis, MN (United States). Mineral Resources Research Center

Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990, 17:30476 (R;US)

Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991, 17:30477 (R;US)

Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)

Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990, 17:30482 (R;US)

Minnesota Univ., St. Paul, MN (United States). Mineral Resources Research Center

Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991, 17:30478 (R;US)

Mississippi State Univ., MS (United States). Diagnostic Instrumentation and Analysis Lab.

A distributed data acquisition and centralized data reduction system for flexible and efficient measurements, 17:31076 (R;US)

Diagnostic development and support of MHD test facilities: Technical progress report, July–September 1990, 17:31077 (R;US)

Montana Dept. of Fish, Wildlife and Parks, Kalispell, MT (United States)

Northwest Montana Libby/Hungry Horse Dams wildlife mitigation Columbian sharp-tailed grouse: Final report, 17:31750 (R;US)

Montana State Univ., Bozeman, MT (United States)

Northwest Montana Libby/Hungry Horse Dams wildlife mitigation Columbian sharp-tailed grouse: Final report, 17:31750 (R;US)

Montgomery (James M.), Inc., Bellevue, WA (United States)

Umatilla Satellite and Release Sites Project: Final siting report, 17:30817 (R;US)

Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki

A simple formula for reducing Feynman diagrams to scalar integrals, 17:32097 (R;SU)

Anomaly-free gauges in superstring theory and double supersymmetric sigma-model, 17:32098 (R;SU)

From the Weyl theory to a theory of locally anisotropic space-time, 17:32099 (R;SU)

General results for massive N-point Feynman diagram with different masses, 17:32096 (R;SU)

Observation of fast neutrons and tritium during electrolysis of heavy water, 17:32427 (R;SU)

Restrictions on the fluxes of relativistic cosmic photinos according to neutrino experiment KAMIOKANDE, 17:32178 (R;SU;In Russian)

Two-flux Monte Carlo approach to electron diffusion in solids, 17:32345 (R;SU)

Mound, Miamisburg, OH (United States)

Hot-wire vs laser, is there a difference?, 17:31633 (R;US)

Nickel plating of flexible products: Statistical optimization, 17:31414 (R;US)

Spectroscopic studies of the 110°C thermal aging of PETN, 17:31274 (R;US)

Mount Holyoke Coll., South Hadley, MA (United States)

Nuclear transparency and double beta decay of molybdenum 100: Annual progress report, March 1, 1992–January 31, 1993, 17:32246 (R;US)

N

Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H

BRST field theory of relativistic particles, 17:32465 (R;NL)

Mechanical behaviour of a closed collar model for an 11.5 T dipole magnet, 17:31519 (R;NL)

On Gupta-Bleuler quantization of systems with second-class constraints, 17:32123 (R;NL)

Operator algebra from fusion rules II: Implementing apparent singularities, 17:32124 (R;NL)

The Mathai-Quillen formalism and topological field theory, 17:32125 (R;NL)

Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie K

Injecting into AmPS when ring cavity operates at 476 MHz, 17:31520 (R;NL)

Using the 16 viewscreens during commissioning of AmPS, 17:31462 (R;NL)

National Academy of Sciences, Washington, DC (United States). Board on Physics and Astronomy

Plasma Science Committee (PLSC) and study on new opportunities in plasma science and technology: Technical progress report, July 15, 1991–May 31, 1992, 17:32417 (R;US)

National Aerospace Lab., Chofu, Tokyo (Japan)

Effects of cooling-air injection on secondary flows and losses in a turbine cascade, 17:31400 (R;JP)

Structural analysis of thermal fatigue failures on rocket combustion chambers by the finite element method, 17:31407 (R;JP)

National Air and Radiation Environmental Lab., Montgomery, AL (United States)

Measurements of electric and magnetic fields in the Waianae, Hawaii area, 17:31041 (R;US)

National Association of Regulatory Utility Commissioners, Washington, DC (United States)

Record of proceedings: Conference on state regulation and the market potential for natural gas: Challenges and opportunities, 17:30593 (R;US)

National Council on Radiation Protection and Measurements, Bethesda, MD (United States)

[Development and recommendations in the area of ionizing and nonionizing radiations]: Progress report, 1 September 1991–30 April 1992, 17:31911 (R;US)

National Environmental Protection Agency, Solna (Sweden)

Radioecology in Nordic limnic systems - present knowledge and future prospects, 17:31757 (R;SE)

National Inst. for Petroleum and Energy Research, Bartlesville, OK (United States)

Measurements of $Al(NO_3)_3$ activities in aqueous nitrate solutions, 17:31310 (R;US)

[National Institute for Petroleum and Energy Research] monthly progress report for June 1992, 17:30574 (R;US)

National Inst. of Radiological Sciences, Chiba (Japan)

Annual report of National Institute of Radiological Sciences of the fiscal year 1990, 17:32495 (R;JP;In Japanese)

National Inst. of Standards and Technology, Gaithersburg, MD (United States)

Computer assisted audit techniques for UNIX (UNIX-CAATS), 17:32509 (R;US)

National Lab. for High Energy Physics, Tsukuba, Ibaraki (Japan)

A simulation study on KEK positron generator, 17:31538 (RA;JP;In Japanese)

A use of EGS4 in the TOPAZ detector simulator, 17:31500 (RA;JP;In Japanese)

Beam diagnostic instruments of TARN II, 17:31537 (RA;JP)

Beam instrumentation for an H^- cyclotron meson factory, 17:31494 (RA;JP)

Beam monitors for rf feedback control in HIMAC synchrotron, 17:31498 (RA;JP)

Beam position monitor using a reentrant coaxial cavity, 17:31496 (RA;JP)

Calculations of bremsstrahlung photon spectrum from β-ray radioisotopes, 17:31580 (RA;JP;In Japanese)

Calculations of LINAC spectrum characteristics using EGS4, 17:31503 (RA;JP;In Japanese)

Design of the JLC positron source, 17:31502 (RA;JP;In Japanese)

Design of TOPAZ masking system using EGS4, 17:31501 (RA;JP;In Japanese)

Effects of the point-like nucleus model on the EGS simulation results, 17:31581 (RA;JP;In Japanese)

Experience with the BEAMSCOPE emittance measurement system at the CERN PS Booster, 17:31495 (RA;JP)

Improvement in the EGS4 code system - general purpose electron-photon Monte Carlo transport code system, 17:31583 (RA;JP;In Japanese)

Method for the beam intensity measurement in a fast-cycling synchrotron, 17:31499 (RA;JP)
Photon Factory activity report, 1991, 17:32492 (R;JP)
Prompt bunch by bunch synchrotron oscillation detection via a fast phase measurement, 17:31497 (RA;JP)
Running EGS4 on Unix workstations and personal computers, 17:31582 (RA;JP;In Japanese)
Spatial distribution of radionuclides produced by photonuclear reactions, 17:32336 (RA;JP;In Japanese)
Treatment of (γ, n) reaction by EGS4 code and connection to MCNP code, 17:32337 (RA;JP;In Japanese)

National Renewable Energy Lab., Golden, CO (United States)
America's best: Outstanding state energy grant projects, 17:31064 (R;US)
District heating and cooling program overview: Advanced energy concepts for utilities: Programs in utility technologies, fiscal years 1990–1991, 17:31146 (R;US)
Electricity from biomass: A development strategy, 17:30801 (R;US)
Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)
Identification of building applications for a variable-conductance insulation, 17:31115 (R;US)
Industrial innovations for tomorrow: Advances in industrial energy-efficiency technologies: Degradable plastic made from potato peels, 17:31128 (R;US)
Microscopic origins of metastable effects in a-Si:H and deep defect characterization in a-Si,Ge:H alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30822 (R;US)
Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30823 (R;US)
Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992, 17:30821 (R;US)

National Science Foundation, Washington, DC (United States)
A review of numerical computations on the mechanics of deformable particles using boundary integral methods, 17:31384 (RA;US)
A theoretical and numerical study of the flow of granular materials, 17:30529 (RA;US)
Computational modeling of granular flow dynamics: Clustering instability in granular gases, 17:30526 (RA;US)
Concentrated colloidal dispersions: Statistical mechanics, 17:31385 (RA;US)
Dense transport and fluidization of solids using kinetic theory, 17:30530 (RA;US)
Dynamic simulation of pressure driven suspension flow, 17:30532 (RA;US)
Dynamical simulations of sedimentation, 17:30533 (RA;US)
Experimental apparatus for the study of flowing granular materials, 17:30518 (RA;US)
Fluidization of particles in horizontal slurry flow, 17:30520 (RA;US)
Granular flows down bumpy inclines, 17:30528 (RA;US)
Methodology of a radiosonde system for the non-intrusive tracking of a particle in a flow, 17:30523 (RA;US)
Multiphase flow studies by NMR with application to granular flows, 17:30519 (RA;US)
Numerical simulation of inclined chute flows of monodisperse, inelastic, frictional spheres, 17:30531 (RA;US)
Optical imaging systems for two phase flow, 17:30524 (RA;US)
Rapid granular shear flows driven by identical, bumpy, frictionless boundaries, 17:30525 (RA;US)
Statistical mechanical theory of inelastic granular systems, 17:30527 (RA;US)
The pendulum model for wake size prediction for a gas bubble in liquid-solid suspensions, 17:31382 (RA;US)
Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows, 17:31383 (RA;US)
Using the refractive index matched technique to study the flow properties of slurries, 17:30521 (RA;US)
Visualization of the wall-slip layer in bounded flows of suspensions, 17:30522 (RA;US)
Wake architectures in two-dimensional fluidization of spheres: Experiments and phenomenological description, 17:30540 (RA;US)
Yield stresses in uniformly fluidized suspensions, 17:30541 (RA;US)

National Swedish Inst. for Building Research, Gaevle (Sweden)
The energy balance of sloping glazings: Simple empirical correlations between the energy flow through a triple glass roof and the outdoor climate, 17:30827 (R;SE;In Swedish)

Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (Russian Federation)
Calculation of accelerating voltage shaping circuits by the gradient-ravine method, 17:31517 (R;SU;In Russian)
Variational characteristics of ion injector for a linear accelerator, 17:31518 (R;SU;In Russian)

Netherlands Energy Research Foundation (ECN), Petten (Netherlands)
A shortcoming of NITAWL/BONAMI causing problems in KENO calculations, 17:32516 (R;NL)
Ac losses test on Nb$_3$Sn strands, 17:32388 (R;NL)
Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor, 17:30685 (R;NL)
Comparative analysis of borehole interaction in the HAW test field, 17:30680 (R;NL)
Convergence measurements in a 300 m deep borehole in rock salt, 17:30684 (R;NL)
Development study of a biological thermal neutron facility for the Petten BNCT project at the LFR, 17:31848 (R;NL)
European Activation File for fusion: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32216 (R;NL)
Fabrication, properties and tritium release rates of lithium zirconates: Paper presented at the 'Third International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93rd Annual Meeting of the American Ceramic Society', Cincinnati, Ohio, April 28-May 2, 1991, 17:32452 (R;NL)
Failure detection studies by layered neural network, 17:30959 (R;NL)
Finite element analyses of a heater-interruption in the HAW test field, 17:30682 (R;NL)
Heat production by photons in the BNCT beam filter components in HB11 at the HFR, 17:31847 (R;NL)
Infrared spectra of the gaseous iodides of chromium, iron and nickel, 17:31227 (R;NL)
International evaluation cooperation task 1.1 : intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32284 (R;NL)
Jain-Lidiard model calculations of radiation damage in sodium chloride: Presented at the Conference REI'6 (Radiation Effects in Insulators-6), June 24-28, 1991, Weimar, Germany, 17:31271 (R;NL)
Neutron metrology in the HFR: Neutron and gamma metrology in the free beam of HB 11, 17:31550 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-594/595/596, 17:32450 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-584/585/586, 17:31225 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-6551, 17:32451 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-587/588/589, 17:31226 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-416, 17:30982 (R;NL)
Neutron metrology in the HFR: Steel irradiation in the HFR R139-656, 17:30983 (R;NL)
Ovality of the steel lining in the HAW test field, 17:30683 (R;NL)
Progress report of the 600 m borehole project of the CEC programme on management and storage of radioactive waste: January-June 1991, 17:30679 (R;NL)
Progress report of the ECN contribution to the experiments in the HAW project: 1st half year 1991, 17:30681 (R;NL)
Shielding calculations for NET: NET contract 89-226, first intermediate report, 17:32449 (R;NL)

Short status report on EFF and EAF projects: Presented at the Topical Conference on Nuclear Data for Fusion Reactor Technology, NEANDC Meeting, Karlsruhe, October 22, 1991, 17:32453 (R;NL)

Simplified modeling and code usage in the PASC-3 code system by the introduction of a programming environment: Contribution to 'International Conference on Nuclear Criticality Safety-INC'91', Oxford, UK, 9-13 September 1991, 17:32517 (R;NL)

Status of the JEF and EFF projects: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:30940 (R;NL)

Structural analyses of ITER toroidal field coils under fault conditions, 17:32454 (R;NL)

Studies on signal validation and sensor surveillance for in-core signals in NPP: Paper presented at the NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburg, Pennsylvania, USA, 1-4 October 1991, 17:30961 (R;NL)

The EFF-2 evaluation for the reaction systems n + ^{52}Cr, ^{56}Fe, ^{58}Ni and ^{60}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32282 (R;NL)

The pre-equilibrium picture of nucleon radiative capture and the neutron-to-gamma competition: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32283 (R;NL)

The sensitivity of statistical model capture calculations to model assumptions: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32217 (R;NL)

The standard molar enthalpies of formation of $BaSiO_3$(s) and Ba_2SiO_4(s), 17:30960 (R;NL)

Nevada Univ., Reno, NV (United States). Seismological Lab.

Active tectonics of the south Caspian basin and surrounding regions, 17:32017 (RA;US)

New England Medical Center, Boston, MA (United States)

[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1988, 17:31775 (R;US)

[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1989, 17:31910 (R;US)

New Jersey Inst. of Tech., Newark, NJ (United States)

On development of a three-dimensional particle motion tracking system, 17:30534 (R;US)

New Mexico Inst. of Mining and Technology, Socorro, NM (United States). New Mexico Petroleum Recovery Research Center

Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report, 17:30567 (R;US)

New Mexico Univ., Albuquerque, NM (United States). Dept. of Mechanical Engineering

Bifurcations in elastic-damaging materials, 17:32366 (R;US)

New York Univ., NY (United States). Courant Inst. of Mathematical Sciences

Plasma properties: Progress report for 1991, 17:32415 (R;US)

Tokamak equilibria and transport based on Grad's thirteen moment description, 17:32414 (R;US)

Niedersaechsisches Landesamt fuer Bodenforschung, Hannover (Germany)

Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee, 17:31712 (IA;IL)

Nielsen (A.) A/S Raadgivende Ingenioerer, Odense (Denmark)

Report on technical measurements concerning measurement of the suction of tanks at Fangel biomass conversion plant, 17:30803 (I;DK;In Danish)

Nordic Council of Ministers. NORDNORM Commission

Labelling electrical household appliances to show their consumption of electicity: Joint Nordic proposal, 17:31110 (I;DK)

Labelling electrical household appliances to show their consumption of electricity: Appendix to the Joint Nordic proposal, 17:31111 (I;DK)

Principles for efficiency standards for the electricity consumption of household appliances: Joint Nordic Proposal, 17:31112 (I;DK;In Danish)

Nordvestjysk Folkecenter for Vedvarende Energi, Hurup (Denmark)

Matching asynchronous generators to small windmills, 17:30857 (I;DK)

Slow-running permanent magnetic generators for wind power etc. 1.5-100 kW: Calculations and draft, 17:30858 (I;DK;In Danish)

Norges Skipsforskningsinstitutt, Trondheim (Norway)

Thermal balance and operational aspects of 3 hour lock-outs at 37 bar during a simulated dive, 17:31410 (R;NO)

Norsk Undervannsteknologisk Senter, Ytre Laksevaag (Norway)

Research program on the biological effects of oil pollution: Final report, 17:30581 (R;NO;In Norwegian)

North Carolina State Univ., Raleigh, NC (United States). Dept. of Mechanical and Aerospace Engineering

Analysis of transport mechanisms in dense fuel droplet sprays: Final report, 17:31344 (R;US)

North Carolina Univ., Chapel Hill, NC (United States)

Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30823 (R;US)

North Dakota Univ., Grand Forks, ND (United States)

Energy and environment: transitions in Eastern Europe: Book of abstracts, 17:30485 (I;CS)

Northwestern Univ., Evanston, IL (United States)

Studies in nonlinear problems of energy: Progress report, January 1, 1992–December 31, 1992, 17:31345 (R;US)

Notre Dame Univ., IN (United States). Radiation Lab.

Radiation Laboratory, University of Notre Dame quarterly report, April 1–June 30, 1992, 17:31324 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States)

DISPERS: Mathematical models for dispersion of radionuclides, 17:32547 (CM;US)

Emergency Response Resources guide for nuclear power plant emergencies: Revision 1, 17:31016 (R;US)

METD: Computer code systems to use with meteorological data, 17:32548 (CM;US)

METD: Computer code systems to use with meteorological data, 17:32549 (CM;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering

Accelerated irradiation test of gundremmingen reactor vessel trepan material, 17:30878 (R;US)

Aging and service wear of solenoid-operated valves used in safety systems of nuclear power plants: Volume 2, Evaluation of monitoring methods, 17:30947 (R;US)

Aging assessment of BWR standby liquid control systems, 17:30962 (R;US)

Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences, 17:31025 (R;US)

Aging data analysis and risk assessment: Development and demonstration study, 17:31024 (R;US)

Aging of non-power-cycle heat exchangers used in nuclear power plants: Operating experience and failure identification: Volume 1, 17:30877 (R;US)

Evaluation of MHTGR fuel reliability, 17:30904 (R;US)

LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)

Nondestructive examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Semiannual report, October 1990–March 1991: Volume 13, 17:30921 (R;US)

Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991, 17:31022 (R;US)

Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility), 17:30993 (R;US)

Proceedings of the fifth workshop on containment integrity, 17:31018 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Freedom of Information and Publications Services

Nuclear Regulatory Commission issuances, June 1992: Volume 35, No. 6, 17:30920 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Operational Assessment

Resources available for nuclear power plant emergencies under the Price-Anderson Act and the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 17:31017 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Regulatory Applications

Sealing performance of bentonite and bentonite/crushed rock borehole plugs, 17:30710 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Issue Resolution

Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP): Volume 3, Part 2, Internal events accident sequence quantification: Appendices, 17:31023 (R;US)

History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants, 17:30897 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Programs

Workshop on the use of PRA methodology for the analysis of reactor events and operational data: Proceedings, 17:31019 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Systems Research

TRAC-BF1/MOD1 models and correlations, 17:31021 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research

Recirculation suction large break LOCA analysis of the Santa Maria De Garona Nuclear Power Plant using TRAC-BF1 (G1J1), 17:31026 (R;US)

Nuklear-Chemie und -Metallurgie GmbH (NUKEM), Hanau (Germany)

World nuclear power plant capacity, 17:31048 (I;DE)

O

Oak Ridge Associated Universities, Inc., TN (United States)

Risk assessment from heterogeneous energy deposition in tissue, the problem of effects from low doses of ionizing radiation, 17:31878 (RA;US)

Oak Ridge K-25 Site, TN (United States)

Engineering Design Information System (EDIS) Information Services Division (ISD) Index Function: User's manual, 17:32575 (R;US)

Oak Ridge K-25 Site, TN (United States). UEO Enrichment Technical Operations Div.

Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)

Oak Ridge National Lab., TN (United States)

A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)

A new apparatus for continuous countercurrent flow of solids and liquids, 17:31124 (R;US)

A radiation-stable intensity meter for ionizing radiation based on alloyed silicon, 17:31596 (RA;US)

Accidental exposure with X-ray diffraction equipment, 17:31992 (RA;US)

Advanced control room design review guidelines: Merging old and new, 17:30956 (R;US)

Advancement and application of bubble detector technology, 17:31590 (RA;US)

Aging and service wear of solenoid-operated valves used in safety systems of nuclear power plants: Volume 2, Evaluation of monitoring methods, 17:30947 (R;US)

Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences, 17:31025 (R;US)

Aging of non-power-cycle heat exchangers used in nuclear power plants: Operating experience and failure identification: Volume 1, 17:30877 (R;US)

An approved personal dosimetry service based on an electronic dosimeter, 17:31591 (RA;US)

Analyses of the reflector tank, cold source, and beam tube cooling for ANS reactor, 17:30994 (R;US)

Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)

Anticipated radiation environmental effect from the Moscow Kaon Factory, 17:30966 (RA;US)

Approach and strategy for performing ecological risk assessments for the Department of Energy Oak Ridge Field Office Environmental Restoration Program: Environmental Restoration Program, 17:31699 (R;US)

Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth, 17:30761 (RA;US)

Atomistic processes of surface segregation during Si-Ge MBE growth, 17:31268 (R;US)

Biasing experiments on the Advanced Toroidal Facility, 17:32404 (R;US)

Calibration correction factors for the Los Alamos neutron well, 17:31593 (RA;US)

Cesium iodide alloys, 17:31613 (PA;US)

Characteristics of potential repository wastes: Volume 1, 17:30869 (R;US)

Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)

Characteristics of potential repository wastes: Volume 3, Appendix 3A, ORIGEN2 decay tables for immobilized high-level waste; Appendix 3B, Interim high-level waste forms, 17:31332 (R;US)

Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B, Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, Supplemental data for Fast Flux Test Facility, 17:30902 (R;US)

Chemical potentials in dilute, multicomponent solutions, 17:31311 (R;US)

Conceptual design summary, 17:30792 (R;US)

Consistency of external dosimetry in epidemiologic studies of nuclear workers, 17:31987 (RA;US)

Contributions of Gerard deSaussure to fission physics: Subthreshold and near-subthreshold measurements at the ORELA, 17:32277 (R;US)

Cost-effective sintered reaction-bonded silicon nitride (SRBSN) for structural ceramics, 17:31254 (R;US)

DACRIN: Radiation organ dose from inhalation, 17:32536 (CM;US)

Data Base Management Plan for the remedial investigation of Waste Area Grouping 5 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:32576 (R;US)

Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)

Detecting low gamma radiation doses using silica glass luminescence, 17:31595 (RA;US)

Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32, 17:31993 (RA;US)

Development of robotics technology for remote characterization and remediationof buried waste, 17:31353 (R;US)

Dose calculation algorithm for the Department of Energy Laboratory Accreditation Program, 17:31592 (RA;US)

Driving a car with custom-designed fuzzy inferencing VLSI chips and boards, 17:32511 (R;US)

Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)

Effect of season, substrate composition, and plant growth on landfill leachate treatment in a constructed wetland, 17:31691 (R;US)

Effects of limiter biasing on the ATF torsatron, 17:32433 (R;US)

Effects of physical properties and geometry on shapes and stability of polarizable drops in external fields, 17:32049 (R;US)

Evaluation of MHTGR fuel reliability, 17:30904 (R;US)

Evaporation of nonazeotropic mixture of refrigerants R143a and R124 flowing inside smooth and corrugated tubes, 17:31386 (R;US)

Experience with NQA-1 quality assurance standards applied to in vitro bioassay, 17:31990 (RA;US)

Experimental challenges at RHIC and LHC, 17:32278 (R;US)

Flowsheet for ^{63}Ni production, 17:31330 (R;US)
Forest declines: Some perspectives on linking processes and patterns, 17:31749 (R;US)
Fuel plate stability experiments and analysis for the Advanced Neutron Source, 17:30973 (R;US)
Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
In vitro and in vivo bioassay applied to uranium trioxide, 17:31989 (RA;US)
Ingot homogenization, 17:31217 (R;US)
Intermediate evaluation of USAID/Cairo energy policy planning project, 17:31049 (R;US)
Investigation of properties and performance of ceramic composite components, 17:31260 (R;US)
Latent heat thermal energy storage for lunar oxygen production, 17:31042 (R;US)
Leak testing plan for the Oak Ridge National Laboratory liquid low-level waste system (active tanks): Volume 1, Regulatory background and plan approach; Volume 2, Methods, protocols, and schedules; Volume 3, Evaluation of the ORNL/LT-823DP differential pressure leak detection method: Environmental Restoration Program, 17:30645 (R;US)
Lifetime measurements in ^{118,120}Xe, 17:32245 (R;US)
Lifetimes of the low spin states in the superdeformed band of ^{192}Hg, 17:32243 (R;US)
Model for impedance of an ionic conductor sandwiched between blocking electrodes, 17:31321 (R;US)
Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)
Motor vehicle fuel economy, the forgotten HC control stragegy?, 17:31187 (R;US)
National laboratories and CRADAs: Summary, 17:31060 (R;US)
Neutron scattering studies of the spin dynamics in La$_{2-x}$Sr$_x$O$_4$, 17:32387 (R;US)
North American radioactive beam initiatives, 17:31430 (R;US)
Optical study of radiation damage in A-SI02 and problems of selective dosimetry of fast neutrons, 17:31988 (RA;US)
Orbiting: toward a unified model of nucleus-nucleus collision or excitation of nuclear molecular states in heavy ion collisions?, 17:32276 (R;US)
Ordering energies and mechanisms in β-phase NiAl, 17:31215 (R;US)
Oxidation-sulfidation behavior of iron alloys containing 16 to 40 atomic percent aluminum, 17:31216 (R;US)
Performance of a plasma fluid code on the Intel parallel computers, 17:32405 (R;US)
Protocol for determination of chemical warfare agent simulant movement through porous media, 17:31642 (R;US)
Remote excavation using the telerobotic small emplacement excavator, 17:31355 (R;US)
SAGEWASP: Optimal electric utility expansion, 17:32524 (CM;US)
ScaLAPACK: A scalable linear algebra library for distributed memory concurrent computers, 17:32514 (R;US)
Sensor-based whole-arm obstacle avoidance for unstructured environments, 17:31354 (R;US)
Shallow-crack toughness results for reactor pressure vessel steel, 17:31218 (R;US)
Simulation and intelligent vehicle highway systems, 17:31119 (R;US)
Space Shuttle dosimetry measurements with RME-III, 17:31597 (RA;US)
Speedup properties of phases in the execution profile of distributed parallel programs, 17:32512 (R;US)
Speedup properties of phases in the execution profile of distributed parallel programs, 17:32558 (R;US)
Standards for message-passing in a distributed memory environment, 17:32559 (R;US)
Study of short-lived rare earth nuclei near the proton drip line, 17:32213 (R;US)
SUBDOSA: External dose airborne radionuclides, 17:32535 (CM;US)
Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program FY 1993–2002, 17:31027 (R;US)
The α-decay properties of light uranium isotopes, 17:32244 (R;US)
The employment of quartz glasses for dosimetry of ionic radiation, 17:31594 (RA;US)
The isolation of lutetium from gadolinium contained in Purex process solutions, 17:30643 (R;US)
The minimum measurable dose of the sensitive Harshaw TLDs, 17:31589 (RA;US)
The nature of scales grown on binary Cr-Nb alloys, 17:31219 (R;US)
The radiation protection experience in KSNP of Taiwan during the past decade, 17:31991 (RA;US)
The status of ANSI N13.11 - The dosimeter performance test standard, 17:31587 (RA;US)
The use of biomarkers to assess environmental health, 17:31692 (R;US)
Thermal analysis of alkylammonium salts, 17:31269 (R;US)
Triple-effect absorption chiller cycles, 17:31096 (R;US)
Uranium hexafluoride (UF$_6$) and 21 PF-1 overpack: Proposed rulemaking revisions, 17:30644 (R;US)
Validating criticality calculations for spent fuel with ^{252}Cf-source-driven noise measurements, 17:31352 (R;US)
Why change the x-ray conversion factors in ANSI N13.11?, 17:31588 (RA;US)

Oak Ridge Y-12 Plant, TN (United States)
A stochastic/deterministic method for transient, three-dimensional neutron transport, 17:32353 (R;US)
Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117, 17:30753 (R;US)
Functional system design document for the Intelligent Inspection System (IIS), 17:32570 (R;US)
Pilot- and field-scale uranium lysimeter studies at the Oak Ridge Y-12 Plant, 17:30754 (R;US)
Program overview of the hollow clay tile wall program, 17:31368 (R;US)
Structural testing of clay tile walls testing and evaluation program, 17:31284 (R;US)
Test procedure for prism compression testing, 17:31369 (R;US)
Work plan for the preliminary assessment and characterization of dense nonaqueous-phase liquids in the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Oak Ridge Y-12 Plant, 17:30745 (R;US)

Ohio State Univ., Columbus, OH (United States). Nuclear Engineering Program
Installation and evaluation of a nuclear power plant operator advisor based on artificial intelligence technology: Interim progress report and second year development plan, 17:30957 (R;US)

Oklahoma Univ., Norman, OK (United States). School of Civil Engineering and Environmental Science
Selenium speciation in ground water: Quarterly report, 17:31753 (R;US)

Oljedirektoratet, Stavanger (Norway)
Marine geophysical studies in the Northern Atlantic with emphasis on sedimentation, crustal structure and subsidence, 17:30565 (I;NO)

Ontario Nuclear Safety Review, Toronto, ON (Canada)
The safety of Ontario's nuclear power reactor. A scientific and technical review. Report to the Minister, 17:30905 (I;CA;In English, French)
The safety of Ontario's nuclear power reactors. A scientific and tecnical review. Vol. 1: Report to the Minister, technical report and annexes, 17:30906 (I;CA)
The safety of Ontario's nuclear power reactors. A scientific and technical review. Vol. 2: Appendices, 17:30908 (I;CA)
The safety of Ontario's nuclear power reactors. A scientific and technical review. Selected consultants' reports, 17:30909 (I;CA)

OPTRA, Inc., Beverly, MA (United States)
Laser surface profilometer with sub-Angstrom resolution, 17:31610 (R;US)

Oregon Univ., Eugene, OR (United States)
Microscopic origins of metastable effects in a-Si:H and deep defect characterization in a-Si,Ge:H alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30822 (R;US)

Osaka Univ., Ibaraki (Japan). Research Center for Nuclear Physics

Proceedings of the RCNP cascade project workshop 'heavy ion secondary beam course', 17:31521 (R;JP;In Japanese)

Proceedings of the workshop on 'spin-charge transfer reaction in atomic collision process' for planning of next period of cascade project, 17:32359 (R;JP;In Japanese)

Oslo Univ. (Norway)

Contrast-enhanced computed tomography of the primary tumor in muscle invasive carcinoma of the urinary bladder, 17:31851 (I;NO)

Marine geophysical studies in the Northern Atlantic with emphasis on sedimentation, crustal structure and subsidence, 17:30565 (I;NO)

Oslo Univ. (Norway). Fysisk Inst.

τ physics at LEP, 17:32180 (R;NO)

A narrow centrally produced 3π resonance at 1080 MeV/c^2 observed in pp-reactions at 19 GeV/c, 17:32179 (R;NO)

A simple algorithm for large, non-linear or singular least squares problems, 17:32560 (R;NO)

Absolute in situ energy calibration of luminosity calorimeters in the DELPHI experiment at LEP, 17:31598 (R;NO)

Bell-type experiments and the concept of locally stochastic causality, 17:32046 (R;NO)

General relativistic model of a spinning cosmic string, 17:32126 (R;NO)

Gravitational effect of the quantum vacuum outside a cosmic string, 17:32127 (R;NO)

Isobar contributions to the imaginary part of the optical-model potential for finite nuclei, 17:32270 (R;NO)

Maximal reductions in the Baker-Hausdorff formula, 17:32044 (R;NO)

Oscillator strengths for transition among low-lying quartet terms in the nitrogen isoelectronic sequence, 17:32238 (R;NO)

Perturbative many-body approaches to finite nuclei, 17:32239 (R;NO)

Quantum theory and questions of reality and completeness, 17:32045 (R;NO)

Section for nuclear physics and energy physics - Annual Report: January 1 - December 31, 1991, 17:32496 (R;NO)

SIRI - A proposal for a multi-detector ΔE-E particle telescope, 17:31599 (R;NO)

Oslo Univ. (Norway). Matematisk Inst.

The interaction between water waves and marine structures, 17:31409 (I;NO)

Oulu Univ. (Finland). Energy Lab.

Technical prevention of cold environments, 17:31116 (R;FI;In Finnish)

The suitability and operational cost of the electrolytic phenol wate water purification, 17:31140 (R;FI;In Finnish)

Oulu Univ. (Finland). Research Inst. of Northern Finland

Measurements, classification and valorization of environmental problems: Case rural area of Oulu, 17:31667 (R;FI;In Finnish)

P

Pacific Northwest Lab., Richland, WA (United States)

A Remote Characterization System for subsurface mapping of buried waste sites, 17:30715 (R;US)

Aging assessment of BWR standby liquid control systems, 17:30962 (R;US)

Alternative materials for solid oxide fuel cells: Factors affecting air-sintering of chromite interconnections, 17:31088 (R;US)

An evaluation of Hanford water treatment practices addendum, 17:30969 (R;US)

An integrated environment for intelligent energy design, 17:31117 (R;US)

An overview of heat exchanger enhancement techniques for industrial applications, 17:31142 (R;US)

Applying ion-molecule reactions to studies of gas-phase protein structure, 17:31762 (R;US)

ASTM international symposium on small specimen test techniques and their applications to pressure vessel annealing and plant life extension, 17:30948 (R;US)

Balancing risk: Ethical issues in risk assessment, 17:31057 (R;US)

Capillary electrophoresis - electrospray ionization mass spectrometry in small diameter capillaries, 17:31763 (R;US)

Cellular and molecular pathways of extremely-low-frequency electromagnetic field interactions with living systems, 17:32006 (R;US)

Characterization and monitoring of total organic chloride vapors, 17:31307 (R;US)

DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)

Effects of lag and maximum growth in contaminant transport and biodegradation modeling, 17:31727 (R;US)

Electron migration in 5-bromouracil-substituted DNA and oligonucleotides in irradiated aqueous solutions, 17:31996 (R;US)

Foreign experience in extended dry storage of spent nuclear fuel, 17:30713 (R;US)

Fourier transform ion cyclotron resonance precision atomic mass measurement limits, 17:31620 (R;US)

Global-local finite element analysis of composite structures, 17:31277 (R;US)

Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992, 17:32000 (R;US)

Hanford radiological protection support services annual report for 1991, 17:31994 (R;US)

Human perceptual deficits as factors in computer interface test and evaluation, 17:31623 (R;US)

Influence of cold work level on the irradiation creep and creep rupture of titanium-modified austenitic stainless steels, 17:31237 (R;US)

Integrated risk management for business survival, 17:32497 (R;US)

Internal energy effects on the solvation and reactivity of multiply charged biomolecules for electrospray ionization mass spectroscopy, 17:31764 (R;US)

Isotopic tailoring with ^{59}Ni to study the effect of helium on microstructural evolution and mechanical properties of neutron-irradiated Fe-Cr-Ni alloys, 17:32466 (R;US)

Issues in risk assessment and modifications of the NRC health effects models, 17:31998 (R;US)

Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)

LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)

Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)

Media information review, January–June 1992: Hanford Environmental Dose Reconstruction Project, 17:32001 (R;US)

Nondestructive examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Semiannual report, October 1990–March 1991: Volume 13, 17:30921 (R;US)

Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991, 17:31022 (R;US)

Noninvasive probing of the ocean surface using laser-based nonlinear optical methods, 17:32015 (R;US)

Public involvement in the Hanford Double-Shell Tank waste disposal program, 17:30712 (R;US)

Quantitative methods for developing C2 system requirement, 17:31624 (R;US)

Radioactive waste management in the USSR: A review of unclassified sources: Volume 2, 17:30711 (R;US)

Tandem mass spectrometry of multiply charged proteins with electrospray ionization, 17:31765 (R;US)

The assessment of risks from exposure to low-levels of ionizing radiation, 17:31995 (R;US)

The response of dispersion-strengthened copper alloys to high fluence neutron irradiation at 415°C, 17:32467 (R;US)

The role of cellular and molecular studies in evaluation of health effects from combined radiation and chemical exposures, 17:31997 (R;US)

Three-dimensional bioremediation modeling in heterogeneous porous media, 17:31728 (R;US)

Ultra wide band 3-D cross section (RCS) holography, 17:31625 (R;US)

Paris-11 Univ., 91 - Orsay (France)

9Cr-1Mo martensitic alloys: effects of the nitrogen, niobium and vanadium additions on the microstructure, phase transformations and mechanical properties, 17:31211 (R;FR;In French)

Extraction of molybdenum by the di-n-butyl 2.2.N.hydroxyhexanamide (tri-n-butylacetohydroxamic acid) from aqueous acidic media, 17:31290 (R;FR;In French)

Reflexion tomography: what information is comprised in the incoming times, 17:30563 (R;FR;In French)

Study of the extraction and the purification of americium and trivalent actinides contained in effluents with supported liquid membranes, 17:31333 (R;FR;In French)

Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire

A signature for isoscalar-spin transitions in (d,d') scattering at intermediate energy, 17:32314 (R;FR)

AGOR: A superconducting cyclotron for light and heavy ions plans for experimental facilities and physics program, 17:31433 (R;FR)

Coherent state operators and n-point invariants for $U_q(sl(2))$, 17:32026 (R;FR)

Compression of polarized ^{3}He, 17:31487 (RA;FR)

Deuteron photodisintegration by linearly polarized photons in the energy region 0.3-1.0 GeV, 17:32310 (RA;FR)

Dynamics and thermalization in violent collisions between ^{40}Ar and Ag at 27 MeV/nucleon, 17:32313 (R;FR)

Experimental searches for narrow dibaryons, 17:32315 (R;FR)

Fine structures in ^{14}C emission of ^{223}Ra and ^{224}Ra, 17:32248 (R;FR)

First polarization experiments at MAMI B, 17:32261 (RA;FR)

Giant resonances and multiphonons states in heavy ion reactions, 17:32316 (R;FR)

Green function and scattering amplitudes in many dimensional space, 17:32029 (R;FR)

Grenoble contribution to the GRAAL collaboration, 17:32312 (RA;FR)

Impact of slow gold clusters on various solids: Non linear effects in secondary ion emission, 17:32377 (R;FR)

Investigation of very neutron rich isotopes towards ^{78}Ni: why and how, 17:32228 (R;FR)

Ion desorption phenomena induced by various types of multiply charged projectiles and by photons on solid surfaces, 17:32378 (R;FR)

Jet targets on electron rings the Argon cluster-beam in ADONE, 17:31530 (RA;FR)

Low energy $^{16}O+^{208}Pb$ elastic scattering: an attempt to analyze the microscopic effective potential, 17:32318 (R;FR)

Magnus approximation in the adiabatic picture, 17:32025 (R;FR)

Measurement of spin-dependent electron scattering from a polarized ^{3}He internal target, 17:32263 (RA;FR)

Measuring the Drell-Hearn-Gerasimov sum-rule, 17:32267 (RA;FR)

Meson physics at Saturne, 17:32162 (R;FR)

Nuclear physics of hot dense matter, 17:32229 (R;FR)

Nucleon form factors, 17:32260 (RA;FR)

Nucleon recoil polarization in quasi-elastic electron scattering with two-body currents, 17:32264 (RA;FR)

On NN → ΔN transition: Bohr's rules and optimal formalism, 17:32163 (R;FR)

Perturbative ground state energy of three anyons in a harmonic potential, 17:32100 (R;FR)

Phase space approach to quantum dynamics, 17:32028 (R;FR)

Photoreactions on the nucleus and on the nucleon with polarized photons, 17:32311 (RA;FR)

Polarization observables in meson photoproduction, 17:32308 (RA;FR)

Polarized electron physics at ELSA, 17:31454 (RA;FR)

Polarized electron sources for stretcher/storage rings, 17:31486 (RA;FR)

Polarized target experiments in Bonn, 17:32309 (RA;FR)

Potential harmonic calculations of the binding energies of bosons and fermions in nuclear physics, 17:32193 (R;FR)

Potential harmonic expansion for atomic wave functions, 17:32354 (R;FR)

Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons, 17:32259 (R;FR)

Random matrix theories and chaotic dynamics, 17:32024 (R;FR)

Response functions for infinite fermion systems with velocity dependent interactions, 17:32230 (R;FR)

Semiclassical quantization of multidimensional systems, 17:32027 (R;FR)

Spin correlations in photo- and electro-disintegration of the few-body systems, 17:32265 (RA;FR)

Study of few-body systems using recoil detection, 17:32262 (RA;FR)

Tagged photon beams obtained by laser Compton scattering on electron beams, 17:32266 (RA;FR)

The integrodifferential equation approach compared with Shell Model calculations on the ^{4}He nucleus, 17:32231 (R;FR)

The Orsay polarized electron source, 17:31485 (RA;FR)

Total cross sections for the $PP\pi$ deg channel in the inelastic PP interaction, 17:32317 (R;FR)

Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire

Analytical formulas for the resonant frequency changes due to opening apertures on cavity walls, 17:31505 (R;FR)

Beauty physics-CKM matrix, 17:32174 (R;FR;In French)

Charm particle physics. A Tool-box for QCD, 17:32173 (R;FR;In French)

Electronics around the accelerators- mathematical recalls, 17:31438 (R;FR;In French)

Focusing characteristics of an accelerating structure with non-circular beam holes, 17:31460 (R;FR)

Heavy flavour physics at LEP, 17:32170 (R;FR)

Higgs production in a photon-photon collider, 17:32171 (R;FR)

Numerical design of an rf-coupling Iris, 17:31504 (R;FR)

Prospects for supersymmetry discoveries at a 500 GeV e^+e^- collider, 17:32172 (R;FR)

Search for new particles in the SUSY framework, 17:32169 (R;FR)

Search for new phenomena at LEP, 17:32168 (R;FR)

Searches for new particles at LEP, 17:32197 (R;FR)

Study of Tau lepton decays with ALEPH detector at LEP, 17:32175 (R;FR;In French, English)

Testing the neutral Higgs sector of the M.S.S.M. with a 300-500 GeV e^+e^- collider, 17:32147 (R;FR)

Paris-6 Univ., 75 (France)

Development of time-resolved laser fluorescence spectrometry for on-line uranium checking in solutions of the Purex reprocessing process, 17:30640 (R;FR;In French)

Numerical dispersion reduction by correction of mass flows. Application to the problem of hydrocarbon recovery by chemical processes, 17:30573 (R;FR;In French)

Synthesis, characterization and reactivity of some lanthanide organometallics, 17:31316 (R;FR;In French)

Partek Oy Ab, Helsinki (Finland)

The design and dimensioning of insulation in power plants and boilers, 17:30863 (R;FI;In Finnish)

Paul Scherrer Inst. (PSI), Villigen (Switzerland)

Irradiation techniques employed at the 10 MW_{th} SAPHIR reactor, 17:30995 (R;CH)

The radionuclide migration experiment - overview of investigations 1985 - 1990: Grimsel test site, 17:31729 (R;CH)

Peat Marwick, Knoxville, TN (United States)

US Department of Energy Uranium Enrichment Activity: Financial statements, September 30, 1991 and 1990, 17:30651 (R;US)

Peat Marwick, Salt Lake City, UT (United States)

US Department of Energy Naval Petroleum Reserves combined financial statement, 17:30583 (R;US)

Western Area Power Administration: Combined power system financial statements and supplemental schedules, 17:31047 (R;US)

Peat Marwick, Tulsa, OK (United States)

Alaska Power Administration federal power program, Juneau, Alaska: Fiscal year 1991, 17:31046 (R;US)

Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering

Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst, 17:30430 (R;US)

Temperature-programmed liquefaction of low-rank coals in H-donor and non-donor solvents, 17:30431 (R;US)

Pittsburgh Univ., PA (United States). Dept. of Chemical and Petroleum Engineering
Research and development for storage, transport, and handling of coal-based fuels: Final report, 17:30537 (R;US)

Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki (Japan)
Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy, 17:30772 (R;US)

Princeton Univ., NJ (United States). Plasma Physics Lab.
Magnetic fusion and project ITER, 17:32468 (R;US)
Observation of ballooning instabilities with medium toroidal mode number in high temperature tokamak plasmas, 17:32434 (R;US)
Transport in a stochastic magnetic field, 17:32435 (R;US)

Public Service Co. of Colorado, Denver, CO (United States)
Integrated dry NO$_x$/SO$_2$ emissions control system: Quarterly report No. 5, January 1–March 31, 1992, 17:30865 (R;US)

Public Utility District No. 1 of Chelan County, Wenatchee, WA (United States). Power Operations Dept.
Rock Island Dam smolt monitoring, 1991, 17:30819 (R;US)

Purdue Univ., Lafayette, IN (United States). School of Nuclear Engineering
Interfacial area and two-phase flow structure development measured by a double-sensor probe, 17:31387 (R;US)

R

Radiation Research Associates, Inc., Fort Worth, TX (United States)
SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)

Rijksinstituut voor Volksgezondheid en Milieuhygiene, Bilthoven (Netherlands)
Measurement of the radiation-level at the site of the Dutch National Institute for Public Health and Environmental Hygiene (RIVM) during the year 1990, 17:31731 (R;NL;In Dutch)

Rio Algom Mines Ltd., Toronto, ON (Canada)
Pilot ALARA analysis applied to dose reduction in an underground uranium mine, 17:30609 (IA;CA)

Risoe National Lab., Roskilde (Denmark)
An assessment of ^{238}Pu and $^{239+240}$Pu in the primary cooling water of a PWR, 17:30898 (R;DK)
Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)

Risoe National Lab., Roskilde (Denmark). Materials Dept.
Materials Department. Annual report 1991, 17:32498 (R;DK)

Risoe National Lab., Roskilde (Denmark). Meteorology and Wind Energy
The cup anemometer and other exciting instruments, 17:30861 (R;DK)

Risoe National Lab., Roskilde (Denmark). Nuclear Safety Research Dept.
Nuclear Safety Research Department. Annual progress report 1991, 17:32500 (R;DK)

Risoe National Lab., Roskilde (Denmark). Optics and Fluid Dynamics Dept.
Optics and Fluid Dynamics Department. Annual progress report 1 January - 31 December 1991, 17:32499 (R;DK)

Risoe National Lab., Roskilde (Denmark). Systems Analysis
Energy problems in the opration of water treatment plants in cold periods: Phase 1 (1988-1990), 17:31149 (R;DK;In Danish)
Systems Analysis Department. Annual progress report 1991, 17:31050 (R;DK)

Rockwell International Corp., Richland, WA (United States). Rockwell Hanford Operations
Draft environmental assessment for characterization of the Hanford Site pursuant to the Nuclear Waste Policy Act of 1982 (Public Law 97-425), Hanford Site, Richland, Benton County, Washington, 17:30660 (R;US)

Royal Inst. of Tech., Stockholm (Sweden). Dept. of Land and Water Resources
Numerical calculations on heterogeneity of groundwater flow, 17:31759 (R;SE)

Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics
Manifestations of electric currents in interstellar molecular clouds, 17:32063 (R;SE)
Preliminary observations of electromagnetic radiation from plasma in presence of a double layer, 17:32436 (R;SE)

Royal Inst. of Tech., Stockholm (Sweden). Dept. of Thermal Engineering
System study, wood powder heat 30 kW - 3 MW, 17:30810 (R;SE;In Swedish)

S

Salzburg Univ. (Austria). Inst. fuer Allgemeine Biologie, Biochemie und Biophysik
Radioecological aspects of former mining activities in the Saxon Erzgebirge, 17:31716 (IA;AT)

Sandia National Labs., Albuquerque, NM (United States)
A computer program for engineering simulations of space reactor system performance, 17:30916 (R;US)
A smoke producing rocket motor for atmospheric wind profiling, 17:31627 (R;US)
A temperature tracking SPICE2G.6 macromodel of the 6N134 optocoupler, 17:31418 (R;US)
An analog macromodel of the SG1525A PWM for use with SPICE2G.6 simulators, 17:31416 (R;US)
An analysis of radionuclide behavior in water pools during accidents at the Annular Core Research Reactor, 17:31028 (R;US)
An NMR study of the occupation of C$_{60}$ interstitial sites by oxygen molecules, 17:32374 (R;US)
Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP): Volume 3, Part 2, Internal events accident sequence quantification: Appendices, 17:31023 (R;US)
Application of a safeguards radiation measurement system to the screening of spent fuel assemblies for transport and storage, 17:30646 (R;US)
Approach to geologic repository post closure system performance assessment, 17:30722 (R;US)
Audit calculations with CORCON-MOD 3 of the duration of superheat in NUREG/CR-5423, 17:31031 (R;US)
Automated dry powder dispenser for explosive components, 17:31640 (R;US)
Automated weapon disassembly, 17:31364 (R;US)
Bifurcations in elastic-damaging materials, 17:32366 (R;US)
Bonding in simple phosphate glass, 17:31279 (R;US)
Eddy current power dissipation at sharp corners, 17:32061 (R;US)
Elevated temperature tensile properties of borated 304 stainless steel: Effect of boride dispersion on strength and ductility, 17:31240 (R;US)
Energy and Environment, August 1992: A Sandia Technology Bulletin, 17:31062 (R;US)
Evaluation of flotation for purification of pyrite for use in thermal batteries, 17:31045 (R;US)
Experiments to investigate the effects of 1:10 scale Zion structures on direct containment heating (DCH) in the Surtsey Test Facility: The IET-1 and IET-1R tests, 17:30899 (R;US)
Gas blowthrough and flow quality correlations for use in the analysis of high pressure melt ejection (HPME) events, 17:31030 (R;US)
Ground test facility for SEI nuclear rocket engines, 17:30917 (R;US)
Interactions between drops of molten Al-Li alloys and liquid water, 17:31029 (R;US)
Interfacial microchemical characterization needs in surface processing, 17:31143 (R;US)
Intra-site secure transport vehicle, 17:30774 (R;US)
Latent image exposure monitor using scatterometry, 17:31419 (R;US)
Lightning threat warning system at the Tonopah Test Range, 17:31639 (R;US)

Low energy helium implantation in evaporated nickel surfaces, 17:32470 (R;US)
Measured data for the Sandia 34-meter vertical axis wind turbine, 17:30862 (R;US)
Mirror alignment techniques for point-focus solar concentrators, 17:30830 (R;US)
Multiwell Experiment final report: 4, The fluvial interval of the Mesaverde Formation, 17:30586 (R;US)
Natural fracture systems studies, 17:30587 (R;US)
Neural network sensor fusion for security applications, 17:31628 (R;US)
Nonideal thermoequilibrium calculations using a large product species data base, 17:31635 (R;US)
Nuclear reactor pressure vessel-specific flaw distribution development, 17:30900 (R;US)
Nuclear Security Systems Center, 17:30775 (R;US)
Numerical simulations of steel plate perforation, 17:31241 (R;US)
Optimization of a VISAR for measuring flyer-plate velocities, 17:31634 (R;US)
Optimization of expressions involving array classes, 17:32563 (R;US)
Proceedings of the fifth workshop on containment integrity, 17:31018 (R;US)
Process designed for experimentation for increased-caliper Fresnel lenses, 17:30829 (R;US)
Propagation of relativistic high current electron beams across the geomagnetic field, 17:31463 (R;US)
RATLER: Robotic All-Terrain Lunar Exploration Rover, 17:31365 (R;US)
Recent advances in methods for measuring the dynamic response of geological materials to 100 GPa, 17:32016 (R;US)
Report on the joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups, 17:32469 (R;US)
RHALE: A MMALE shock physics code written in C++, 17:32562 (R;US)
Sample Vial Secure Container (SVSC), 17:30648 (R;US)
Simulation of liquid drop breakup behavior in a flow field using discrete element techniques, 17:31401 (R;US)
Small-scale brine inflow experiments: Data report through June 6, 1991, 17:30718 (R;US)
Software overview for the Annunciator Communication System: Interim report: Revision, 17:31626 (R;US)
Steady-state cooling of a high-temperature superconducting motor, 17:32392 (R;US)
Steady-state saturation profiles for linear immiscible fluid displacement in porous media, 17:30720 (R;US)
Swelling pressure, water uptake, and permeability of 70/30 crushed salt/bentonite, 17:30721 (R;US)
Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project, 17:30669 (R;US)
Temperature tracking SPICE macro-model for laser and LED driven opto-coupler assemblies, 17:31417 (R;US)
The problem with security: Public perception versus reality, 17:32485 (R;US)
Thermodynamically consistent theories for elastoplasticity coupled with damage, 17:31242 (R;US)
Total System Performance Assessment Code (TOSPAC): Volume 2, User's guide: Yucca Mountain Site Characterization Project, 17:30717 (R;US)
Transportation Systems Center, 17:30647 (R;US)
TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project, 17:30719 (R;US)
Uses of Monte Carlo computer simulations in understanding epitaxial growth and ion bombardment of Si(001), 17:31278 (R;US)

Sandia National Labs., Livermore, CA (United States)
Nonlinear stability of combustion-driven acoustic oscillations in resonance tubes, 17:32062 (R;US)
Soot and fuel distribution imaging in a diesel engine, 17:31157 (R;US)
TCP performance analysis for wide area networks, 17:32564 (R;US)

Savannah River Lab., Aiken, SC (United States). Technical Div.
Heat flux limits for control and safety rods, 17:31006 (R;US)

Science Applications International Corp., McLean, VA (United States). Foreign Applied Sciences Assessment Center
Non-US artificial neural network research: FASAC special study, 17:32550 (R;US)

Science Applications International Corp., Oak Ridge, TN (United States)
Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117, 17:30753 (R;US)

Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France)
Monthly results of measurements. January 1992, 17:31669 (R;FR;In French)
Monthly results of measurements. February 1992, 17:31670 (R;FR;In French)
Monthly results of measurements; December 1991, 17:30968 (R;FR;In French)

Skidaway Inst. of Oceanography, Savannah, GA (United States)
The flux and recycling of bioactive substances in the surface sediments of the deep basins off southern California: Final report, 17:31695 (R;US)

Slovenska Vedeckotechnicka Spolocnost, Bratislava (Czechoslovakia). Dom Techniky
4th international school of nondestructive testing, 17:31403 (I;CS;In Czech, Slovak)
Corrosion problems of materials for mechanical, power and chemical engineering: National conference, 17:31230 (I;CS;In Czech, Slovak)

SMHI Oceanographical Lab., Goeteborg (Sweden)
The conditions of the seas around Sweden: Report from the activities in 1991, 17:31756 (R;SE;In Swedish, English)

Society of AECL Employees, Deep River, ON (Canada)
Nuclear safety. Beyond the technical details, 17:31032 (I;CA)

Solar Energy Research Inst., Golden, CO (United States)
Simultaneous saccharification and fermentation (SSF) using cellobiose fermenting yeast Brettanomyces custersii (CBS 5512), 17:30807 (PA;US)

Solarex Corp., Newtown, PA (United States). Thin Film Div.
Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992, 17:30821 (R;US)

Southwest Research Inst., San Antonio, TX (United States)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, April 15, 1989–July 14, 1989, 17:31153 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 July 1989–14 October 1989, 17:31154 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 October 1989–14 January 1990, 17:31155 (R;US)
Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 1, Text, 17:32004 (R;US)
Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 2, Appendices, 17:32005 (R;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Sixth quarterly progress report, October 15, 1988–January 15, 1989], 17:31151 (R;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly status report No. 7, January 15, 1989–April 15, 1989], 17:31152 (R;US)

SRI International, Menlo Park, CA (United States)
Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991, 17:32479 (R;US)
Synthesis of model compounds for coal liquefaction research: Quarterly report No. 1, June 21, 1990–September 20, 1990, 17:30453 (R;US)

SRI International, Menlo Park, CA (United States). Molecular Physics Lab.
Cleavage and crosslinking of polymeric coal structures during pyrolysis: Final report, 17:30435 (R;US)
Mitigating crosslinking reactions through preconversion strategies: Quarterly progress report, 17:30457 (R;US)

Stanford Linear Accelerator Center, Menlo Park, CA (United States)
3-dimensional bundle adjustments in industrial metrology: A comparison, 17:31525 (R;US)
A combined analysis of SLAC experiments on deep inelastic e-p and e-d scattering, 17:32183 (R;US)
A simple model for SLC positron stability issues, 17:31464 (R;US)
Beam-beam diagnostics from closed-orbit distortion, 17:31465 (R;US)
Chiral corrections to the anomalous 2γ decays of π^0, η and η', 17:32182 (R;US)
Designing reliability into accelerators, 17:31442 (R;US)
Inclusive charged hadron and K^0 production in two-photon interactions, 17:32181 (R;US)
Mechanical equipment for magnet measurement and alignment, 17:31523 (R;US)
Optimizing the injection straight of PEP II asymmetric B Factory at SLAC, 17:31522 (R;US)
Polarized electron sources for linear colliders, 17:31524 (R;US)
PROGLOOK: User program performance monitor, 17:32540 (CM;US)
Review of SLC performance, 17:31441 (R;US)
Review of studies on conventional linear colliders in the S- and X-Band regime, 17:31440 (R;US)
Second quantization in bit-string physics: Revision, 17:32047 (R;US)
SLAC modulator operation and reliability in the SLC Era, 17:31526 (R;US)
Test of QED using a laser at the SLAC final focus test beam, 17:32184 (R;US)
The accuracy of beam-beam diagnostics for circular colliders, 17:31466 (R;US)
The early days of the S_n method, 17:32352 (R;US)

Stanford Univ., CA (United States). High Temperature Gasdynamics Lab.
Characterization of fly ash, 17:30462 (RA;US)
Measurement of radiant properties of fly ash dispersions, 17:30464 (RA;US)
The optical properties of high temperature slag, 17:30463 (RA;US)

Stanford Univ., CA (United States). Petroleum Research Inst.
A three-dimensional laboratory steam injection model allowing in situ saturation measurements, 17:30569 (R;US)
Visualization of foam/oil in a new, high resolution, sandstone replica micromodel, 17:30568 (R;US)

Stanford Univ., CA (United States). Stanford Geothermal Program
Stanford Geothermal Program [quarterly technical progress reports, July–September 1990 and October–December 1990], 17:30846 (R;US)
Stanford Geothermal Program [quarterly technical report, January–March 1991], 17:30847 (R;US)
Stanford Geothermal Program [quarterly technical report, April–June 1991; topical report, July 1, 1990–June 30, 1991], 17:30848 (R;US)
Stanford Geothermal Program [quarterly technical report, July–September 1991], 17:30849 (R;US)

State Univ. of New York, Albany, NY (United States). Research Foundation
[Calorimeter based detectors for high energy hadron colliders]: [Progress report], 17:31549 (R;US)

Statens Forurensningstilsyn, Oslo (Norway)
State of the Arctic Environment: Report on oil pollution, 17:30580 (I;NO)

Stockholm Environment Inst. (Sweden)
What role can nuclear power play in mitigating global warming?, 17:32494 (R;SE)

Strasbourg-1 Univ., 67 (France)
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)
Development of high resolution double-sided silicon detectors with projective readout, 17:31548 (R;FR;In French)
Nuclear superdeformation at high spins, 17:32215 (R;FR)
Perfecting of a computer program for PIXE quantitative analysis, 17:31293 (R;FR;In French)
Study of high energy ion implantation of boron and oxygen in silicon, 17:32376 (R;FR;In French)

Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires
A fast position sensitive photodetector based on a CsI reflective photocathode, 17:31547 (R;FR)
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)
Development of high resolution double-sided silicon detectors with projective readout, 17:31548 (R;FR;In French)
Energy damping and intermediate velocity fragment emission in peripheral Kr+Au collisions at 43 MeV/u, 17:32280 (R;FR)
Nuclear superdeformation at high spins, 17:32215 (R;FR)
Perfecting of a computer program for PIXE quantitative analysis, 17:31293 (R;FR;In French)
Quark-gluon plasma searches: today and tomorrow, 17:32131 (R;FR)
Statistical emission of complex fragments from highly excited compound nucleus, 17:32279 (R;FR)
Study of high energy ion implantation of boron and oxygen in silicon, 17:32376 (R;FR;In French)
Towards superdeformation in the quasicontinuum: microscopic view of the excited superdeformed bands and the corresponding level densities, 17:32214 (R;FR)
Twisted WZW superstring solutions, 17:32071 (R;FR)
Variational principle in stochastic quantization and 1/N expansion, 17:32072 (R;FR)

Studsvik Energy, Nykoeping (Sweden)
Quantum chemical methods of V_2O_5-TiO_2 catalysts, 17:31666 (R;SE;In Swedish, English)

Superconducting Super Collider Lab., Dallas, TX (United States)
ASST Interconnect Region single phase pressure tests, 17:31528 (R;US)
Fully pipelined and programmable Level 1 trigger, 17:31527 (R;US)
Longitudinal beam dynamics with rf noise, 17:31468 (R;US)
Low frequency transverse resistive instability in the collider, 17:31467 (R;US)
Magnetic field perturbation caused by bending vibrations of a quadrupole, 17:31469 (R;US)
Modification to footprint to accommodate an external fixed-target hall, 17:31443 (R;US)
Superstring derived standard-like models and the top quark mass hierarchy, 17:32128 (R;US)

Svenska Renhaallningsverksfoereningen, Malmoe (Sweden)
NO_x reducing measures at five Swedish waste incineration plants, 17:30868 (R;SE;In Swedish)

Swedish Council for Building Research, Stockholm (Sweden)
Demand controlled ventilating systems: Sensor market survey, 17:31091 (R;SE)
Glazed courtyard at Taernan: Thermal performance of the courtyard and surrounding residential buildings. Measurements and calculations, 17:31093 (R;SE)
Heat measurements in fluid systems, 17:31094 (R;SE;In Swedish)
Heating and cooling with low-temperature water: Prerequisities, experiences, possibilities, 17:31145 (R;SE;In Swedish)
SAS Froesundavik. An office heated and cooled by groundwater, 17:31092 (R;SE)

Swedish Environmental Protection Agency, Solna (Sweden)
Air monitoring in the Arctic: 1980-90, 17:31672 (R;SE)
Impact of fuels on diesel exhaust emissions: A chemical and biological characterization, 17:30582 (R;SE)
Measurements of total ozone, 17:31671 (R;SE)
Metal concentrations of the mor layer, 17:31736 (R;SE)

Wetlands and lakes as nitrogen traps: Research programme for the period 1 July 1990 - 30 June 1994, 17:31758 (R;SE)

Swedish Environmental Research Inst., Goeteborg (Sweden)

A comparison of different chemical models for use in regional simulations of air pollution, 17:31659 (R;SE;In Swedish)

The importance of chemical and meteorological processes in the atmosphere for meso-scale ozone formation, 17:31660 (R;SE;In Swedish)

Swedish Environmental Research Inst., Stockholm (Sweden)

A study of working conditions at biogas extraction, garbage sorting, and handling of hazardous wastes, 17:30815 (R;SE;In Swedish)

Modelling of cadmium fluxes on energy crop land, 17:30812 (R;SE)

Swedish Inst. of Agricultural Engineering, Uppsala (Sweden)

Salix plantation: Machinery, methods and economy, 17:30798 (R;SE;In Swedish)

Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden)

A simple method for separating fines from fuel chips, 17:30805 (R;SE;In Swedish)

Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)

Biological follow-up in short rotation cultivation on farmland, 17:30799 (R;SE;In Swedish)

Biomass fuels - effects on the carbon dioxide budget, 17:30813 (R;SE)

Black liquor gasification: Consequences for pulping process and energy balance, 17:31139 (R;SE)

Conductivity measurements on dolomite at reaction conditions, 17:30804 (R;SE)

Development of catalysts for internal reforming in molten carbonate fuel cell, 17:31087 (R;SE)

Final report of ICCP-activity, stage 5, 17:30474 (R;SE;In Swedish, English)

Growing energy: A national economy analysis of energy from arable land, 17:30811 (R;SE;In Swedish)

IEA wind energy.: Annual report 1991, 17:30854 (R;SE)

Investigation of an electrical converter system with an induction generator for variable speed operation of a wind turbine, 17:30860 (R;SE)

Linear quadratic control of variable speed wind turbines below rated power, 17:30859 (R;SE)

Measuring equipment to determine the status of polyethylene pipes, 17:31275 (R;SE;In Swedish)

Part 1: Logging residues in piles - Needle loss and fuel quality. Part 2: Nitrogen leaching under piles of logging residues, 17:30806 (R;SE;In Swedish)

Photoelectrochemical production of hydrogen, 17:30796 (RA;SE)

Physical modelling of a refuse fueled boiler, 17:30808 (R;SE;In Swedish)

Pilot plant for sealed gas-storage facility at Graengesberg (Sweden), 17:30598 (R;SE;In Swedish)

Program of research and development on the production of hydrogen from water: Annual progress report 1990, 17:30795 (R;SE)

Quantum chemical methods of V_2O_5-TiO_2 catalysts, 17:31666 (R;SE;In Swedish, English)

Salix plantation: Machinery, methods and economy, 17:30798 (R;SE;In Swedish)

Seasonal storage of solar heating at Nynaeshamn, 17:30831 (R;SE;In Swedish)

Study of a MSW incinerator: Overall operation and on-site measurements in the fire box, 17:30809 (R;SE)

The diesel engine and its potential for improvement, 17:31156 (R;SE;In Swedish)

Wind energy calculations for Swedish coastal water conditions. Report nr 3, 17:30855 (R;SE;In Swedish)

Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden)

A compartment model for solute transport in the near field of a repository for radioactive waste (calculations for Pu-239), 17:31732 (R;SE)

Analysis of spatial correlation of hydraulic conductivity data from the Stripa mine, 17:31740 (R;SE)

Characterization of the structure and geometry of the H fracture zone at the SCV site, 17:31745 (R;SE)

Concentrations of particulate matter and humic substances in deep groundwaters and estimated effects on the adsorption and transport of radionuclides, 17:31755 (R;SE)

Coupled processes in the near-field, 17:30729 (RA;SE)

Cross-verification testing of fracture flow and mass transport codes, 17:31741 (R;SE)

Description of hydrogeological data in SKB's database GEOTAB. Version 2, 17:30756 (R;SE)

Description of transport pathways in a KBS-3 type repository, 17:31733 (R;SE)

Evaporation measurement in the validation drift - part 2, 17:31739 (R;SE)

Evaporation measurement in the validation drift - part 3: Comparison between the first and second set of measurement results, 17:31744 (R;SE)

Final report of the rock sealing project - Sealing properties and longevity of smectitic clay grouts, 17:30733 (R;SE)

Final report on Test 4 - Sealing of natural fine-fracture zone, 17:31738 (R;SE)

Fjaellveden study site. Scope of activities and main results, 17:31735 (R;SE)

Gideaa study site. Scope of activities and main results, 17:31734 (R;SE)

Integrated near-field assessment, 17:30730 (RA;SE)

Modelling for the Stripa site characterization and validation drift inflow: prediction of flow through fractured rock, 17:31743 (R;SE)

NAPSAC technical document, 17:31742 (R;SE)

Near field transport processes, 17:30728 (RA;SE)

Performance assessment perspectives with reference to the proposed repository at Yucca Mountain, Nevada, 17:30724 (RA;SE)

Proceedings from the technical workshop on near-field performance assessment for high-level waste, 17:30723 (R;SE)

Sensitivity analysis and validation, 17:30731 (RA;SE)

Site characterization and validation - monitoring of head in the Stripa mine during 1991, 17:31737 (R;SE)

Solubility and speciation studies for nuclear repository performance assessment, 17:30727 (RA;SE)

Source term models for the release of radionuclides from used nuclear fuel, 17:30726 (RA;SE)

Testing near-field models for deep disposal, 17:30732 (RA;SE)

What do we know about nuclear waste glass performance in the repository near field?, 17:30725 (RA;SE)

Swedish Plant Inspectorate, Stockholm (Sweden)

Application of probabilistic fracutre mechanics to allocation of NDT for nuclear pressure vessels, 17:30949 (R;SE)

Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Economics

Growing energy: A national economy analysis of energy from arable land, 17:30811 (R;SE;In Swedish)

Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Forest Products

Part 1: Logging residues in piles - Needle loss and fuel quality. Part 2: Nitrogen leaching under piles of logging residues, 17:30806 (R;SE;In Swedish)

Syracuse Univ., NY (United States)

Research program in elementary particle physics, Task A; Outstanding Junior Investigator Program, Task B: Final report, July 1, 1985–December 31, 1991 and Final report, July 1, 1987–December 31, 1991, 17:32066 (R;US)

T

Teachers Academy for Mathematics and Science, Chicago, IL (United States)

The Teachers Academy for Mathematics and Science: Executive summary and program activities update, 17:32481 (R;US)

Technical Univ. of Denmark, Lyngby (Denmark). Inst. of Mathematical and Operations Research

Experiences gained in the use of prognoses for heat demand in Esbjerg, 17:31148 (I;DK;In Danish)

Time-continuous dynamic models for heat exchangers, 17:30845 (I;DK;In Danish)

Technische Hochschule Darmstadt (Germany). Inst. fuer Kernphysik
An 'in acceptance' comparison of Si + Au data and RQMD predictions, 17:32286 (IA;DE)
Analysis of discrete ambiguities for $\pi N \Delta$ and $\rho N \Delta$ vertex functions using inclusive charge-exchange reactions, 17:32256 (IA;DE)
Baryon and pion distributions from nucleus-nucleus collisions at 15 GeV/nucleon, 17:32287 (IA;DE)
Chiral symmetry in particle physics and its manifest realization in terms of parity doublets, 17:32094 (IA;DE)
Collisions in an expanding pion gas and the pperpendicular to spectrum in ultrarelativistic heavy ion collisions, 17:32301 (IA;DE)
Coupling and decoupling of pions and deltas in nuclear matter, 17:32225 (IA;DE)
Detection of neutrons by BAF$_2$ TAPS modules in relativistic heavy ion collisions, 17:31566 (IA;DE)
Dilepton radiation from partially equilibrated parton matter, 17:32141 (IA;DE)
Dynamical simulation of quark systems within a covariant transport approach, 17:32160 (IA;DE)
Exclusive studies of neutron and charged particle emission in relativistic heavy ion reactions, 17:32290 (IA;DE)
Experimental considerations to measure thermal photons at RHIC, 17:32288 (IA;DE)
Finite positive pion chemical potential and lepton pair production in heavy ion collisions, 17:32300 (IA;DE)
Fluctuations of multiplicities in rapidity windows in sulphur-sulphur collisions at 200 AGeV, 17:32293 (IA;DE)
FOrPI studies of Au on Au collisions at SIS energies, 17:32289 (IA;DE)
Fragmentation in the string-flux tube model, 17:32095 (IA;DE)
Fragmentation of gold projectiles: From evaporation to vaporization, 17:32291 (IA;DE)
Gross properties of nuclei and nuclear excitations. Proceedings, 17:32285 (I;DE)
Hadronic and quark screening lengths from lattice QCD, 17:32140 (IA;DE)
Hadronic gas models and equilibration in heavy ion collisions, 17:32295 (IA;DE)
Hadronic sources of dileptons from heavy ion collisions at intermediate and relativistic energies, 17:32299 (IA;DE)
Inclusion of fluctuations in BUU nuclear dynamics, 17:32254 (IA;DE)
Kaon condensation in dense hadronic matter, 17:32227 (IA;DE)
Medium dependent pion-production in heavy-ion collisions within the quantum molecular dynamics, 17:32307 (IA;DE)
Medium effects on quark and meson masses, 17:32191 (IA;DE)
Modifications of scalar and vector mesons in nuclear matter, 17:32226 (IA;DE)
N-body collisions in high-energy nuclear reactions, 17:32298 (IA;DE)
NA 38 future, 17:32135 (IA;DE)
Nucleon electric form factors and quark sea polarization in the Nambu-Jona-Lasinio model, 17:32138 (IA;DE)
Nucleus as a canonical ensemble, 17:32222 (IA;DE)
Onset of multifragmentation in medium energy heavy ion collisions, 17:32302 (IA;DE)
Particle production at SIS energies and the nuclear equation of state, 17:32296 (IA;DE)
Pauli blocking and dynamical multifragmentation calculations, 17:32257 (IA;DE)
Phase-transitions in nuclear matter: Deconfinement of quarks and gluons?, 17:32220 (IA;DE)
Properties of the ρ-meson in dense nuclear matter, 17:32224 (IA;DE)
Relativistic BUU-approach with momentum-dependent mean-fields, 17:32306 (IA;DE)
Relativistic mean-field three-fluid model for intermediate-energy heavy-ion collisions. Simulation of kinetic results, 17:32304 (IA;DE)
Relativistic quantum hadron molecular dynamics (RQHMD) for heavy collisions, 17:32305 (IA;DE)
Relativistic transport equations from quantum field theory, 17:32255 (IA;DE)
Scale and chiral symmetry breaking at finite density in the NJL model, 17:32093 (IA;DE)
Scaling effects and properties of Δ-isobar resonances, 17:32192 (IA;DE)
Small angle correlations of intermediate mass fragments in reactions Au + Au at E/A = 100, 150, 250 MeV, 17:32292 (IA;DE)
Stopping power and viscosity of the quark-gluon plasma, 17:32136 (IA;DE)
Subthreshold kaon production in 1 GeV/u Au+Au collision within quantum molecular dynamics, 17:32303 (IA;DE)
Surface multifragmentation investigated with a finite temperature spherical TDHF model, 17:32258 (IA;DE)
Systematics of charm hadroproduction, 17:32159 (IA;DE)
The chiral and the deconfinement phase transition in the chromodielectric model, 17:32139 (IA;DE)
The high-energetic component in pion spectra from Au + Au and Ne + NaF at 1 GeV/u$^+$, 17:32297 (IA;DE)
The meson contribution to semi-inclusive deep inelastic scattering with slow protons in the final state, 17:32161 (IA;DE)
The self consistent quark-gluon plasma, 17:32137 (IA;DE)
Thermal properties and medium effects in the study of heavy-ion collisions with realistic NN interactions, 17:32294 (IA;DE)
Two-loop corrections for nuclear matter in the Walecka model with form factors, 17:32223 (IA;DE)
'Local' EMC effects and the J/ψ suppression, 17:32221 (IA;DE)

Tennessee Technological Univ., Cookeville, TN (United States). Dept. of Physics
Electromagnetic properties of ^{181}Ir: Evidence of β-stretching?, 17:32242 (R;US)

Tennessee Univ., Knoxville, TN (United States). Dept. of Nuclear Engineering
Contributions of Gerard deSaussure to fission physics: Subthreshold and near-subthreshold measurements at the ORELA, 17:32277 (R;US)

Tennessee Univ., Tullahoma, TN (United States). Space Inst.
Anion-exchange resin-based desulfurization process: Quarterly technical progress report, April 1, 1992–June 30, 1992, 17:30864 (R;US)

Tennessee Valley Authority, Chattanooga, TN (United States)
Energy efficient motors reference guide: First edition, 17:31144 (R;US)

Texas A and M Univ., College Station, TX (United States). Dept. of Chemical Engineering
Oxygen electrode reaction in molten carbonate fuel cells: Final report, September 15, 1987–September 14, 1990, 17:31086 (R;US)

Texas Univ., Austin, TX (United States)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32532 (CM;US)
Oil recovery improvement through profile modification by thermal precipitation, 17:30570 (R;US)

Texas Univ., Austin, TX (United States). Inst. for Fusion Studies
Dynamics of the ion-ion acoustic instability in the thermalization of ion beams, 17:32050 (R;US)
Fast ion-driven Bernstein instabilities, 17:32418 (R;US)
Fusion, magnetic confinement, 17:32421 (R;US)
Nonlinear studies of m = 1 modes in high-temperature plasmas, 17:32419 (R;US)
The electrostatic wake of a superthermal test electron in a magnetized plasma, 17:32420 (R;US)

Texas Univ., Houston, TX (United States)
Bacterially induced precipitation of CaCO$_3$: An example from studies of cyanobacterial mats: Final report, 17:31645 (R;US)

Texas Univ., Houston, TX (United States). Dept. of Physics
Hadronic interactions at intermediate energies: Progress report, November 1987, 17:32155 (R;US)

TransAlta Technologies, Inc., Marion, IL (United States)
Low NO$_x$/SO$_x$ Burner retrofit for utility cyclone boilers: Public design report, 17:30545 (R;US)
Low NO$_x$/SO$_x$ Burner retrofit for utility cyclone boilers: Quarterly technical progress report, October–December 1990, 17:30546 (R;US)
Low NO$_x$/SO$_x$ Burner retrofit for utility cyclone boilers: Quarterly technical progress report, June–September 1990, 17:30547 (R;US)

Trondheim Univ. (Norway). Norges Tekniske Hoegskole
Stochastic methods in energy planning: Application to expansion planning and short-term load forecasting, 17:31068 (I;NO)
Studies on dynamics and control of distillation columns, 17:31138 (I;NO)

Turku School of Economics (Finland)
Exergy measure for the energy use of Finland economy in 1985, 17:31090 (R;FI;In Finnish)

U

United Engineers and Constructors, Inc., Englewood, CO (United States). Western Operations
Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3, 17:30676 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5, 17:30677 (R;US)

Universidad Politecnica de Cataluna, Barcelona (Spain). Escuela Tecnica Superior de Ingenieros de Caminos, Canales y Puertos
Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes, 17:30699 (R;FR;In French)

Universidad Politecnica de Madrid (Spain)
Recirculation suction large break LOCA analysis of the Santa Maria De Garona Nuclear Power Plant using TRAC-BF1 (G1J1), 17:31026 (R;US)

Universite de Technologie de Compiegne, 60 (France)
The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria, 17:31210 (R;FR;In French)

Universities Research Association, Waxahachie, TX (United States)
Proceedings of the 1991 Symposium on the Superconducting Super Collider: "The Project, The Progress, The Physics", 17:31444 (R;US)

University of Wales Coll. of Cardiff (United Kingdom). Welsh School of Architecture
Solar building study. Final report: Spinney Gardens [Crystal Palace, London], 17:30826 (R;GB)

URS Consultants, Inc., New York, NY (United States)
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)

USDOE Alaska Power Administration, Juneau, AK (United States)
Divestiture summary report: Sale of Eklutna and Snettisham hydroelectric projects, 17:30816 (R;US)

USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Office of Industrial Processes
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Annual report, Fiscal Year 1991, 17:31220 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Management Plan, 17:31126 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Research Plan, 17:31127 (R;US)

USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). Office of Environmental Audit
Line Program Environmental Management Audit: Formerly Utilized Sites Remedial Action Program, 17:32488 (R;US)

USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). RCRA/CERCLA Div.
Regulated underground storage tanks, 17:30661 (R;US)

USDOE Assistant Secretary for Environmental Restoration and Waste Management, Washington, DC (United States)
Independent technical review of Savannah River Site Defense Waste Processing Facility technical issues, 17:30662 (R;US)

USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)
Comprehensive report to Congress: Proposals received in response to the Clean Coal Technology IV Program Opportunity Notice, 17:30420 (R;US)

USDOE Assistant Secretary for Management and Administration, Washington, DC (United States). Office of Project and Facilities Management
DOE Real Property: A yearly statistical handbook: Fiscal year 1992, 17:32486 (R;US)

USDOE Bonneville Power Administration, Portland, OR (United States)
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use
Derived annual estimates of manufacturing energy consumption, 1974–1988, 17:31075 (R;US)
International Petroleum Statistics Report, July 1992, 17:31073 (R;US)
Short-term energy outlook: Quarterly projections, Third quarter 1992, 17:31066 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas
Natural gas monthly, July 1992, 17:30594 (R;US)
Petroleum marketing monthly, August 1992, 17:30577 (R;US)
Petroleum supply monthly, August 1992, 17:30576 (R;US)
Petroleum supply monthly, July 1992, 17:31072 (R;US)

USDOE Morgantown Energy Technology Center, WV (United States)
Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)
The validation of horizontal well models using a physical model of heat flow in an anisotropic conductor, 17:30572 (R;US)
Unconventional gas systems analysis, 17:30590 (R;US)

USDOE Office of Administration and Human Resource Management, Washington, DC (United States)
Work for others at the US Department of Energy: Summary report, 17:32487 (R;US)

USDOE Office of Energy Research, Washington, DC (United States). Advanced Energy Projects Div.
Advanced energy projects FY 1992 research summaries, 17:32480 (R;US)

USDOE Office of Energy Research, Washington, DC (United States). Office of Health and Environmental Research
Human Genome, 1991–1992 program report, 17:31766 (R;US)
Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)

USDOE Office of Environmental Restoration and Waste Management, Washington, DC (United States)
Transportation Assessment and Integration (TRAIN): A basis for planning DOE transportation in the 1990s: Final report, 17:31065 (R;US)

USDOE Office of Inspector General, Oak Ridge, TN (United States). Eastern Regional Audit Office
Procurement activities at the Strategic Petroleum Reserve, 17:30584 (R;US)

USDOE Office of Inspector General, Washington, DC (United States). Office of Assistant Inspector General for Audits
Alaska Power Administration federal power program, Juneau, Alaska: Fiscal year 1991, 17:31046 (R;US)
Report on Fiscal Year 1991 financial statement audit of the Low-Level Radioactive Waste Surcharge Escrow Account (CR-FC-92-1), 17:30664 (R;US)
US Department of Energy Naval Petroleum Reserves combined financial statement, 17:30583 (R;US)
Western Area Power Administration: Combined power system financial statements and supplemental schedules, 17:31047 (R;US)

USDOE Office of Procurement, Assistance and Program Management, Washington, DC (United States)
DOE Personal Property Management Factbook, Fiscal Year 1991, 17:32489 (R;US)

USDOE Pittsburgh Energy Technology Center, PA (United States)

A review of numerical computations on the mechanics of deformable particles using boundary integral methods, 17:31384 (RA;US)
A theoretical and numerical study of the flow of granular materials, 17:30529 (RA;US)
BOILER PERF MODEL3.0: Fossil-fired boilers, 17:32522 (CM;US)
Computational modeling of granular flow dynamics: Clustering instability in granular gases, 17:30526 (RA;US)
Concentrated colloidal dispersions: Statistical mechanics, 17:31385 (RA;US)
Dense transport and fluidization of solids using kinetic theory, 17:30530 (RA;US)
Dynamic simulation of pressure driven suspension flow, 17:30532 (RA;US)
Dynamical simulations of sedimentation, 17:30533 (RA;US)
Experimental apparatus for the study of flowing granular materials, 17:30518 (RA;US)
Fluidization of particles in horizontal slurry flow, 17:30520 (RA;US)
Granular flows down bumpy inclines, 17:30528 (RA;US)
Methodology of a radiosonde system for the non-intrusive tracking of a particle in a flow, 17:30523 (RA;US)
Multiphase flow studies by NMR with application to granular flows, 17:30519 (RA;US)
Numerical simulation of inclined chute flows of monodisperse, inelastic, frictional spheres, 17:30531 (RA;US)
Optical imaging systems for two phase flow, 17:30524 (RA;US)
Rapid granular shear flows driven by identical, bumpy, frictionless boundaries, 17:30525 (RA;US)
Statistical mechanical theory of inelastic granular systems, 17:30527 (RA;US)
The pendulum model for wake size prediction for a gas bubble in liquid-solid suspensions, 17:31382 (RA;US)
Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows, 17:31383 (RA;US)
Using the refractive index matched technique to study the flow properties of slurries, 17:30521 (RA;US)
Visualization of the wall-slip layer in bounded flows of suspensions, 17:30522 (RA;US)
Wake architectures in two-dimensional fluidization of spheres: Experiments and phenomenological description, 17:30540 (RA;US)
Yield stresses in uniformly fluidized suspensions, 17:30541 (RA;US)

USDOE Pittsburgh Energy Technology Center, PA (United States). Coal Preparation Div.

Performance evaluation of micronized-magnetite cycloning at high relative densities of separation, 17:30427 (R;US)

USDOE Richland Field Office, WA (United States)

1992 Report on Hanford Site land disposal restrictions for mixed wastes, 17:30779 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 2, 17:30671 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 3, 17:30672 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 4, 17:30673 (R;US)

USDOE Yucca Mountain Site Characterization Project Office, Las Vegas, NV (United States)

Yucca Mountain Site Characterization Project Technical Data Catalog: Yucca Mountain Site Characterization Project, 17:30668 (R;US)

USDOE, Washington, DC (United States)

1992 DOE Defense Critical Technologies Plan, 17:31193 (R;US)
Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act Section 120(e)(5): Annual report to Congress for Fiscal Year 1991, 17:30758 (R;US)
DOE Fundamentals Handbook: Classical Physics, 17:30926 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 1, 17:30927 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 2, 17:30928 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 3, 17:30929 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 4, 17:30930 (R;US)
DOE Fundamentals Handbook: Instrumentation and Control, Volume 1, 17:30934 (R;US)
DOE Fundamentals Handbook: Instrumentation and Control, Volume 2, 17:30935 (R;US)
DOE Fundamentals Handbook: Mathematics, Volume 1, 17:30936 (R;US)
DOE Fundamentals Handbook: Mathematics, Volume 2, 17:30937 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 1, 17:30931 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 2, 17:30932 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 3, 17:30933 (R;US)
Environment, Safety and Health Progress Assessment of the Hanford Site, 17:31051 (R;US)
PMAS4.0: Performance Measurement Analysis System, 17:32520 (CM;US)
Record of proceedings: Conference on state regulation and the market potential for natural gas: Challenges and opportunities, 17:30593 (R;US)

Utah Univ., Salt Lake City, UT (United States)

Cyclic voltammetric study, 17:30422 (RA;US)
Electrochemical and flotation experiments involving particulate mineral and coal pyrite, 17:30424 (RA;US)
ESCA studies of particulate pyrite, 17:30471 (RA;US)
The floatability of mineral and coal pyrite, 17:30423 (RA;US)

Utah Univ., Salt Lake City, UT (United States). Dept. of Mechanical Engineering

The hydrophobic character of nonsulfide mineral surfaces as influenced by double-bond reactions of adsorbed unsaturated collector species: Progress report, 17:31295 (R;US)

Utah Univ., Salt Lake City, UT (United States). Dept. of Mining Engineering

Formation and retention of methane in coal: Final report, 17:30470 (R;US)

V

Vattenfall Utveckling AB, Aelvkarleby (Sweden)

Techniques for separation of green parts, and nutrient content in green parts, 17:30814 (R;SE;In Swedish)

Vattenfall Utveckling AB, Vaellingby (Sweden)

Natural gas and biogas vehicles: Projects and activities during 1991, 17:31190 (R;SE;In Swedish)

Virginia Polytechnic Inst. and State Univ., Blacksburg, VA (United States). Dept. of Engineering Science and Mechanics

Investigation of properties and performance of ceramic composite components, 17:31260 (R;US)

Vista Research, Inc., Mountain View, CA (United States)

Leak testing plan for the Oak Ridge National Laboratory liquid low-level waste system (active tanks): Volume 1, Regulatory background and plan approach; Volume 2, Methods, protocols, and schedules; Volume 3, Evaluation of the ORNL/LT-823DP differential pressure leak detection method: Environmental Restoration Program, 17:30645 (R;US)

Voimayhtioeiden Ydinjaetetoimikunta, Helsinki (Finland)

Deformation stresses and mechanical behaviour of engineered barriers in the repository environment, 17:30750 (R;FI;In Finnish)
Ground water chemistry and water-rock interaction at Olkiluoto, 17:30752 (R;FI)
On the world's ice ages and changing environments, 17:30747 (R;FI)
Redox capacity of crystalline rocks - laboratory studies under 100 bar oxygen gas pressure, 17:30751 (R;FI)
Scenarios for groundwater flow and radionuclide migration of concern for the TVO-92 safety analysis, 17:30749 (R;FI)
SKB/TVO ice age scenario, 17:30748 (R;FI)
Spent fuel characteristics for TVO-92 safety analysis, 17:30879 (R;FI;In Finnish)

Vyzkumny Ustav Energeticky, Prague (Czechoslovakia)
Energy and environment: transitions in Eastern Europe: Book of abstracts, 17:30485 (I;CS)

W

Washington State Univ., Pullman, WA (United States). Dept. of Mechanical and Materials Engineering
Independent verification and validation testing of the FLASH computer code, Versiion 3.0, 17:31698 (R;US)
Washington Univ., Seattle, WA (United States)
Theoretical standards in x-ray spectroscopies: Annual progress report, 1991–1992, 17:32355 (R;US)
Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory
Institute for Nuclear Theory annual report No. 2, 1 March 1991–29 February 1992, 17:32208 (R;US)
Institute for Nuclear Theory [annual report]: Program 6, Mesons and fields in nuclei, 30 September 1991–31 January 1992; Program 7, Fundamental interactions in nuclei, 1 February 1992–31 May 1992: Final report, 17:32207 (R;US)
Western Research Inst., Laramie, WY (United States)
The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
Westinghouse Electric Corp., Carlsbad, NM (United States). Waste Isolation Div.
WIPP supplementary roof support system, Room 1, Panel 1: Geotechnical field data analysis bi-annual report, 17:30678 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Conversion Dept.
Solid oxide fuel cell processing using plasma arc spray deposition techniques: Final report, 17:31083 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Systems Dept.
Research and development for storage, transport, and handling of coal-based fuels: Final report, 17:30537 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (United States). Atomic Power Div.
LEOPARDSPOTS: Spectrum calc with depletion, 17:32533 (CM;US)
Westinghouse Hanford Co., Richland, WA (United States)
Communicating science and energy in public-lessons from the real world, 17:31063 (R;US)
Fiscal year 1992 program plan for evaluation of ferrocyanide in the Hanford Site waste tanks: Revision 2, 17:30739 (R;US)
Hanford Federal Facility Agreement and Consent Order, quarterly progress report, March 31, 1992, 17:30674 (R;US)
Plutonium finishing plant comparison with 40 CFR 61, subpart H, and other referenced guidelines for stack 291-Z-1, 17:30757 (R;US)
Quality performance-based training enhances safe and effective transport operations, 17:30649 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)
Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States)
Calciner Pilot Plant waste minimization practices at the ICPP, 17:30742 (R;US)
Growth kinetics for the precipitation of zirconium hydroxide from aqueous zirconium and tin bearing solutions by the addition of ammonium hydroxide, 17:30741 (R;US)
ICPP custom dissolver explosion recovery, 17:30763 (R;US)
Laboratory studies of the behavior of undissolved solids in both pulsed and packed column extraction systems, 17:31308 (R;US)
Spectrophotometric determination of hydrogen peroxide in the presence of fluoride, 17:31309 (R;US)
Westinghouse Savannah River Co., Aiken, SC (United States)
A discrete ordinates approximation to the neutron transport equation applied to generalized geometries, 17:30938 (R;US)
A graded approach to safety documentation at processing facilities, 17:30764 (R;US)
Actuator system history of safety rod lower latch problems review of latch inspection video tapes, 17:31039 (R;US)
Aluminum oxide film thickness and emittance, 17:31038 (R;US)
Cadmium safety rod thermal tests, 17:30963 (R;US)
Effluent versus inlet header break analysis for SRS-reactor LOPA scenario, 17:30950 (R;US)
Electrochemical oxidation of organic materials, 17:31141 (PA;US)
Engineering evaluation of the General Motors (GM) diesel rating and capabilities, 17:31040 (R;US)
Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector, 17:31748 (R;US)
Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
Intergranular stress corrosion cracking: A rationalization of apparent differences among stress corrosion cracking tendencies for sensitized regions in the process water piping and in the tanks of SRS reactors, 17:30996 (R;US)
On-line process control monitoring system, 17:31306 (PA;US)
Particle blockage and flow degeneration in Savannah River Site reactor fuel/target assemblies, 17:31033 (R;US)
Phase stability determinations of DWPF waste glasses, 17:30743 (R;US)
Random one-of-N selector, 17:30773 (PA;US)
Remediating biofouling of reverse osmosis membranes, 17:31367 (R;US)
Reviews of computing technology: Fiber distributed data interface: Revision, 17:32568 (R;US)
Savannah River Site computing standards and guidelines reference, 17:32569 (R;US)
Solid state safety jumper cables, 17:31150 (PA;US)
Spray nozzle pattern test for the DWPF HEME task technical plan, 17:30744 (R;US)
Statistical process management: An essential element of quality improvement, 17:32501 (R;US)
Structure of the nocturnal boundary layer over a complex terrain, 17:31680 (R;US)
The possibility of steam explosions for a misseated septifoil in the SRS K Production reactor, 17:31035 (R;US)
The steam explosion potential for an unseated SRS reactor septifoil, 17:31037 (R;US)
Thermal hydraulic performance of naturally aspirated control rod housing assemblies, 17:31034 (R;US)
Variable path length spectrophotometric probe, 17:31611 (PA;US)

Wisconsin Univ., Madison, WI (United States)
Fluid dynamics of supercritical helium within cable-in-conduit conductors: Progress report, 17:32393 (R;US)
Measurement of current density fluctuations and ambipolar particle flux due to magnetic fluctuations in MST, 17:32411 (R;US)

Wisconsin Univ., Madison, WI (United States). Dept. of Chemical Engineering
[New process modeling, design and control strategies for energy efficiency, high product quality and improved productivity in the process industries], 17:31313 (R;US)

Wisconsin Univ., Madison, WI (United States). Dept. of Physics
Anomalous ion heating and superthermal electrons in the MST reversed-field pinch, 17:32413 (R;US)
Current density fluctuations, nonlinear coupling, and transport in MST, 17:32412 (R;US)

Y

Yale Univ., New Haven, CT (United States). Dept. of Chemical Engineering
Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991, 17:30437 (R;US)

Yale Univ., New Haven, CT (United States). Dept. of Physics
The spin of the nucleon in deep inelastic lepton scattering experiments, 17:32188 (R;US)

Personal Author Index

Authors' surnames are indexed in the form appearing in the publication cited; given names generally have been reduced to initials. For documents with multiple authors, each author name is indexed. The entry for a primary author (first author listed on an abstracted document) includes the full document title and citation number. Entries for other authors provide a cross-reference to the primary author. Also included is information on the document type, country of publication, and the document language listed in parentheses in the format (J;FR;In French and English). Accent marks are not input because of computer alphabetization. Spelling and transliteration follow standard conventions.

A

Aakesson, N., *See* Holstein, F., 17:30811
Aarkrog, A., Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)
Aashamar, K., *See* Andersen, J.O., 17:32238
Abbatt, J.D., *See* Nair, R.C., 17:31936
Abbeele, A.D. Van den, *See* Mariani, G., 17:31817
Abdel-Dayem, H.M., *See* Ozker, K., 17:31781
Abdel-Fattah, A.T., *See* Hussein, H.A., 17:30612
Abdukadyrova, I.Kh., Detecting low gamma radiation doses using silica glass luminescence, 17:31595 (RA;US)
  Optical study of radiation damage in A-SI02 and problems of selective dosimetry of fast neutrons, 17:31988 (RA;US)
Abel, E., LVIS-2000 and ETRR Future building services and energy-efficient buildings and building components: Evaluation of the research programmes 1988-1990, 17:31107 (R;FI)
Abeledo, M.A., *See* Noda Gomez, J., 17:31862
Abrams, D.N., *See* Billinghurst, M.W., 17:31779, 17:31790
Abrams, G.S., *See* Cords, D., 17:32181
Aceto, S.C., *See* Uckan, T., 17:32404, 17:32433
Ackerman, J.P., *See* Chow, L.S., 17:30654
Adam, M.J., *See* Chan, G.L.Y., 17:31845
Adam, R.M., The integrodifferential equation approach compared with Shell Model calculations on the ^{4}He nucleus, 17:32231 (R;FR)
Adamian, F.V., Deuteron photodisintegration by linearly polarized photons in the energy region 0.3-1.0 GeV, 17:32310 (RA;FR)
Adams, E.L., *See* Rinard, P.M., 17:30709
Adamson, M.G., *See* Gray, L.W., 17:31322
  See Moir, R.W., 17:32471
Adaway, D.W., *See* Bremner, W.B., 17:30695
Adelstein, S.J., *See* Mariani, G., 17:31817
Adloff,, *See* Mueller, W.F.J., 17:32291
Adloff, J.C., *See* Stuttge, L., 17:32280
Adrian, R.J., *See* Liu, Z.C., 17:30524
Aeikees, T., *See* Ahlbom, K., 17:30748
Aeppli, G., *See* Hayden, S.M., 17:32387
Afanas'ev, L.G., Wide aperture scintillation hodoscope with FEU-85, 17:31568 (R;SU;In Russian)
Affanni, J.M., *See* Canellas, C.O., 17:31843
Aguillon, C., *See* Chaffron, L., 17:31249
Ahlbom, K., Fjaellveden study site. Scope of activities and main results, 17:31735 (R;SE)
  Gideaa study site. Scope of activities and main results, 17:31734 (R;SE)
  SKB/TVO ice age scenario, 17:30748 (R;FI)
Ahlgren, L., *See* Leide, S., 17:31906
Ahmad, M.M., *See* Koziar, G., 17:30589
Ahmed, S., *See* Kumar, R., 17:31188
Ahner, W., *See* Senger, P., 17:32296
Ahrens, L., The operational status of the Booster injector for the AGS accelerator complex at BNL, 17:31476 (R;US)
Aine, C.J., *See* George, J.S., 17:31849
Akabani, G., Absorbed dose calculations to blood and blood vessels for internally deposited radionuclides, 17:31891 (RA;US)
  Reevaluation of S-values considering electron transport, 17:31893 (RA;US)
  See Liu, J.C., 17:31896
  See Shearer, T.W., 17:31895
Akera, H., Landau level quantization and superconductivity, 17:32381 (R;US)
Akhmadalyev, A., *See* Yunucov, M.C., 17:31596
Akhmanov, V.V., Upgrading of the stabilized direct-current power supply unit for the main winding of the iron-current channel at the JINR phasotron, 17:31492 (R;SU;In Russian)
Akif'ev, A.P., *See* Izmajlov, D.M., 17:31976
  See Khandogina, E.K., 17:31973
Akimoto, Masayuki, *See* Watanabe, Tadashi, 17:31394
Akin'shin, D.V., *See* Goleminov, N.G., 17:31604
Albrecht, G.F., Optical monitor for observing turbulent flow, 17:31612 (PA;US)
Aldis, D.F., Oil shale ash-layer thickness and char combustion kinetics, 17:30602 (R;US)
Aldrich, K.S., *See* Sellers, C.H., 17:31228
Alejnikov, V.E., *See* Krylov, A.R., 17:32347
Aleksandrov, I.D., Photoreactivation of γ-induced premutations damages in Drosophila wild and phr$^-$ genotypes, 17:31977 (RA;SU;In Russian)
Aleksandrov, I.L., *See* Aleksandrova, M.V., 17:31974
Aleksandrov, V.S., JINR Tau-charm factory design considerations, 17:31533 (R;SU)
Aleksandrova, M.V., To the problem of DNA-target for radiation-induced exchange chromosomal aberrations, 17:31974 (RA;SU;In Russian)
  See Aleksandrov, I.D., 17:31977
Alekseev, V.L., Influence of neutron spin orientation on Laue diffraction in a non-centrosymmetric crystal, 17:32380 (R;SU;In Russian)
Alenitskij, Yu.G., Convertion project of the AS UzSSR cyclotron, 17:31435 (R;SU;In Russian)
Alexander, D., *See* Vaughan, N., 17:30826
Alexander, W.R., *See* Frick, U., 17:31729
Alexiades, V., *See* Solomon, A.D., 17:31042
Alfredsson, M., *See* Sahlqvist, L., 17:30831
Alimov, R., The employment of quartz glasses for dosimetry of ionic radiation, 17:31594 (RA;US)
Alipov, E.D., *See* Belyaev, I.Ya., 17:31957
Allard, B., Concentrations of particulate matter and humic substances in deep groundwaters and estimated effects on the adsorption and transport of radionuclides, 17:31755 (R;SE)
Allemand, R., *See* Vacher, J., 17:31771
Allemann, R.T., *See* Ritzman, R.L., 17:31015
Allen, G.R., *See* Rosocha, L.A., 17:31662
Allen, M.D., Experiments to investigate the effects of 1:10 scale Zion structures on direct containment heating (DCH) in the Surtsey Test Facility: The IET-1 and IET-1R tests, 17:30899 (R;US)

Allen, S.L., A design for an advanced divertor for DIII-D and ITER: The radiative slot divertor, 17:32474 (R;US)
Allison, C.M., *See* Rempe, J.L., 17:31009
Allison, D.K., The possibility of steam explosions for a misseated septifoil in the SRS K Production reactor, 17:31035 (R;US)
The steam explosion potential for an unseated SRS reactor septifoil, 17:31037 (R;US)
Allison, P., *See* Smith, H.V. Jr., 17:31509
Allwine, K.J., *See* Whiteman, C.D., 17:31668
Almagri, A., *See* Hokin, S., 17:32413
Almagri, A.F., *See* Prager, S.C., 17:32412
Almon, A.C., Electrochemical oxidation of organic materials, 17:31141 (PA;US)
Aloni, A., Industrial radiography, 17:30791 (R;IL;In Hebrew)
Alonso, A., *See* Buron, J.M., 17:31342
See Gonzalez, C., 17:30946
Alriksson, S.B., *See* Ledin, S.R., 17:30799
Alster, J., *See* Whitlow, L.W., 17:32183
Altherr, T., Electromagnetic interactions and chirality flip of neutrinos in a thermal background, 17:32199 (R;FR)
Infrared singularities cancellation in reaction rates at finite temperature, 17:32115 (R;FR)
Altobelli, S.A., Multiphase flow studies by NMR with application to granular flows, 17:30519 (RA;US)
Alvarez de Davila, E., A study of working conditions at biogas extraction, garbage sorting, and handling of hazardous wastes, 17:30815 (R;SE;In Swedish)
Alviso, C.T., *See* Kong, F.M., 17:31280
See Pekala, R.W., 17:31282
Ameduri, F., *See* Roussel-Dupre, D., 17:32055
Amendt, P., *See* Eder, D.C., 17:31425
Amidei, D., *See* Cords, D., 17:32181
Aminoff, C.G., *See* Arianer, J., 17:31485
Amir, S., *See* Margaliot, M., 17:31926
Amirkhanov, I.V., Evaluation of the high energy proton accumulation effect in the geomagnetic field by the mapping method, 17:32051 (R;SU;In Russian)
Newtonian iterative scheme for solving Schwinger-Dyson equation for a quark, 17:32145 (R;SU)
Numerical method of solution of a boundary value problem for the coupled integro-differential equations (The Bethe-Salpeter equation), 17:32037 (R;SU;In Russian)
See Sarikov, N.A., 17:32144
Amirtaev, K.G., *See* Basha, S.G., 17:31961, 17:31962
Ammer, J.R., *See* Sabeh, M., 17:30572
Amui, J., *See* Larsen, J.W., 17:30456
An Yiiu, *See* Wang Shuyu, 17:30788
Andeas, H.E., Bell-type experiments and the concept of locally stochastic causality, 17:32046 (R;NO)
Quantum theory and questions of reality and completeness, 17:32045 (R;NO)
Andersen, J.O., Oscillator strengths for transition among low-lying quartet terms in the nitrogen isoelectronic sequence, 17:32238 (R;NO)
Anderson, D., *See* Sergeev, A., 17:32409
Anderson, G.K., *See* Rosocha, L.A., 17:31662
Anderson, J., *See* Hircq, B., 17:32440
Anderson, J.L., Countercurrent flow-limiting characteristics of a Savannah River Plant control rod septifoil, 17:31011 (R;US)
Anderson, M.T., Methodology to identify risk-significant components for inservice inspection and testing, 17:31010 (R;US)
Anderson, P.D., *See* Kercher, J.R., 17:31674
Anderson, R.J., *See* Gaarenstroom, S.W., 17:31143
Anderson, S.E., Laboratory directed research and development FY91: Revision 1, 17:31285 (R;US)
Andersson, Arne, Metal concentrations of the mor layer, 17:31736 (R;SE)
Andersson, Ingrid, Experimental evaluation of different parameters importance for the frosting process between plates, 17:31399 (RA;SE;In Swedish)
Frost formation - A literature study, 17:31397 (RA;SE;In Swedish)
Frost growth in convection between two plates with one cold side, 17:31398 (RA;SE;In Swedish)
Theoretical and experimental studies of frost between two plates, 17:31396 (R;SE;In Swedish)
Andersson, J.E., *See* Ahlbom, K., 17:31734, 17:31735
Andersson, Lars, The conditions of the seas around Sweden: Report from the activities in 1991, 17:31756 (R;SE;In Swedish, English)
Andersson, R., *See* Jansson, M., 17:31758
Andersson, T., 'Soft' electric heating. Control of resistance heating radiators, 17:31108 (R;SE;In Swedish)
Andersson-Skoeld, Y., *See* Pleijel, K., 17:31659, 17:31660
Andre, M., ICF related experiments at CEL-V, 17:32439 (R;FR)
Andresen, H., First polarization experiments at MAMI B, 17:32261 (RA;FR)
Andrews, C.M., *See* Lampley, C.M., 17:32545
Andrews, H.R., Nuclear safety. Beyond the technical details, 17:31032 (I;CA)
Andrews, M.K., Phase stability determinations of DWPF waste glasses, 17:30743 (R;US)
Andzheevski, Yu.A., Measurement of the cross section of the $^{36}\mathrm{Ar}(n,\alpha)^{33}\mathrm{S}$ and $^{50}\mathrm{V}(n,p)^{50}\mathrm{Ti}$ reactions induced by thermal neutrons, 17:32333 (R;SU;In Russian)
Angel, E.C., *See* Trowbridge, L.D., 17:31317
Angelberger, P., *See* Leitha, T., 17:31802, 17:31814
Angelis, A., *See* Sawas-Dimopoulou, C., 17:31916
Anghinolfi, M., Jet targets on electron rings the Argon cluster-beam in ADONE, 17:31530 (RA;FR)
Anheier, N.C. Jr., Characterization and monitoring of total organic chloride vapors, 17:31307 (R;US)
Annand, J., *See* Andresen, H., 17:32261
Annanmaki, M., Calibration of the airborne radon daughter monitor, 17:31554 (IA;CA)
EROS: Electronic radon observation system, 17:31560 (IA;CA)
Anne, R., A non interceptive heavy ion beam profile monitor based on residual gas ionization, 17:31484 (R;FR)
Ansoborlo, E., *See* Henge-Napoli, M.H., 17:31989
Antich, P., *See* Goomer, N.C., 17:31780
Antipov, A.V., *See* Khandogina, E.K., 17:31973
Anton, G., Polarized target experiments in Bonn, 17:32309 (RA;FR)
Antonenko, N.V., Mechanism of enhanced yield of light particles in compound nucleus formation: diffusion description, 17:32328 (R;SU)
Antonenko, S.G., The disturbance of micro element exchange in different blood of animals irradiated by different radiation sources, 17:31984 (RA;UA;In Russian)
The role of ceruloplasmin in rise of resistance modes of organism to different radiation, 17:31985 (RA;UA;In Russian)
Antropov, V.K., *See* Aleksandrov, V.S., 17:31533
Anttila, M., Spent fuel characteristics for TVO-92 safety analysis, 17:30879 (R;FI;In Finnish)
Anttila, P., Finnish research project on acidification (HAPRO), 17:31683 (R;FI)
Aoto, Akira, *See* Koori, Norihiko, 17:32322
Appelman, K.H., Neutron metrology in the HFR: Steel irradiation R139-6551, 17:32451 (R;NL)
Appleby, A.J., Oxygen electrode reaction in molten carbonate fuel cells: Final report, September 15, 1987–September 14, 1990, 17:31086 (R;US)
Apted, M., *See* Sellin, P., 17:30723
Aragon, B., *See* Cruz Inclan, C., 17:31252
Arbit, E., *See* Daghighian, F., 17:31902
Archer, A., Age relationships from U-Th-Pb isotope studies of uranium mineralization in Wernecke breccias, Yukon Territory, 17:30605 (RA;CA)
Archer, V.E., *See* Roscoe, R.J., 17:31943
Archuleta, J.I., *See* Lawson, A.C., 17:32041
Argiro, G., *See* Shukla, S.K., 17:31786, 17:31810
Arianer, J., The Orsay polarized electron source, 17:31485 (RA;FR)
Arkhipov, O.V., *See* Aleksandrov, V.S., 17:31533
Armbruster, P., *See* Bernas, M., 17:32228
Armentrout, D.L., The effect of precipitate forming elements in Al 4.5% Mg alloys on the measured acoustic emission and on Lueders band deformation, 17:31239 (R;US)
Arner, S.A., OJT...make 'em or break 'em, 17:32490 (R;US)
Arnold, R., A fast position sensitive photodetector based on a CsI reflective photocathode, 17:31547 (R;FR)

See Whitlow, L.W., 17:32183

Arthur, E.D, *See* Young, P.G., 17:32269

Artyukhov, V.I., Correlation experiments on checking the existence of low temperature nuclear fusion in titanium and zirconium deuterides, 17:32429 (R;SU)

Experimental observation of neutron emission insaturation of titanium chips with gaseous deuterium, 17:32431 (R;SU)

Observation of neutron bursts in saturation of titanium with deuterium by means of D_2O electrolysis, 17:32430 (R;SU)

Arvieu, R., Quantum tunneling in the periodically driven SU(2) model, 17:32020 (R;FR)

Arvieux, J., Spin observables in the $pp \to pK^+Y$ reactions at Saturne, 17:32154 (R;FR)

Strangeness production in the $pp \to pK^+Y$ and $pA \to pK^+X$ reactions at Saturne, 17:32153 (R;FR)

Asami, Akira, *See* Kamitani, Takuya, 17:31538

Asami, Tetsuo, *See* Fukahori, Tokio, 17:32462

Asaro, M., *See* Hirschon, A.S., 17:30453

Asher, W.E., *See* Korenowski, G.M., 17:32015

Ashok, A.S., *See* Dave, R.N., 17:30534

Ashton, J.R., *See* Donaldson, A.R., 17:31526

Ashwill, T.D., Measured data for the Sandia 34-meter vertical axis wind turbine, 17:30862 (R;US)

Askari, E., *See* Jenkins, J.T., 17:30525

Aspiazu, J., Perfecting of a computer program for PIXE quantitative analysis, 17:31293 (R;FR;In French)

Assadi, S., *See* Hokin, S., 17:32413

See Prager, S.C., 17:32412

Assael, Y., Measurement system of 'free' radon in rocks, 17:31700 (IA;IL)

Assink, R.A., An NMR study of the occupation of C_{60} interstitial sites by oxygen molecules, 17:32374 (R;US)

Atalay, A., Selenium speciation in ground water: Quarterly report, 17:31753 (R;US)

Atayan, R.R., Postradiation recovery and radioresistance of seeds, 17:31958 (IA;SU;In Russian)

Atcher, R.W., *See* Hay, R.V., 17:31892

Atencio, J.H., *See* Dyer, R.B., 17:31630

Atkins, W.H., *See* Cole, R.A., 17:31507

See Johnson, K.F., 17:31512, 17:31513

Atochina, E., *See* Danilov, S., 17:31788

Attaya, H., *See* Billone, M.C., 17:32438

Atwell, W., *See* Hardy, K.A., 17:31597

Atwood, C.L., *See* Wolford, A.J., 17:31024

Aubert, J.J., *See* Wyon, C., 17:31250

Aubry, S., Bipolaronic charge density waves, polaronic spin density waves and high $T_c$superconductivity, 17:32390 (R;US)

Auerbach, O., *See* Saccomanno, G., 17:31942

Auger, J.P., On NN → ΔN transition: Bohr's rules and optimal formalism, 17:32163 (R;FR)

Aulenbacher, K., *See* Andresen, H., 17:32261

Aurenche, P., A comparison of the real-time and the imaginary-time formalisms of finite temperature field theory for 2,3, and 4-point Green's functions, 17:32121 (R;FR)

Avest, D. ter, *See* Emden, W. van, 17:31519

Avicola, K., High frame-rate, large field wavefront sensor, 17:32064 (R;US)

Avila-Segura, F.E., *See* Campbell, C.S., 17:30520

Avis, I., *See* Weiner, R.E., 17:31789

Avramenko, S.A., Charge exchange $^7Li \to ^7Be$ cross sections at 21 GeV/c on H,C,Al,Cu, Pb nuclei, 17:32331 (R;SU;In Russian)

Charge-exchange cross sections of the $^3H \to ^3He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)

Ayalon, A., Diagenesis of Inmar Formation, southern Israel: Stable isotope studies of carbonate minerale, 17:31701 (IA;IL)

See Summer, N.S., 17:31708

Aydemir, A.Y., Nonlinear studies of m = 1 modes in high-temperature plasmas, 17:32419 (R;US)

Azhgirej, L.S., A possible interpretation of anomalous behaviour of proton spectrum at 0 deg from deuteron fragmentation at 9 GeV/c, 17:32330 (RA;SU;In Russian)

Aziz, M.J., Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991, 17:31270 (R;US)

Azumi, Masafumi, Japanese contribution of ITER PF systems design during CDA, 17:32460 (R;JP)

B

Baard, J.H., Neutron metrology in the HFR: Steel irradiation in the HFR R139-656, 17:30983 (R;NL)

Neutron metrology in the HFR: Steel irradiation R139-584/585/586, 17:31225 (R;NL)

Neutron metrology in the HFR: Steel irradiation R139-594/595/596, 17:32450 (R;NL)

Baatarkhuub, D., *See* Gehrbish, Sh., 17:31301

Baba, Mamoru, Proceedings of the 1991 symposium on nuclear data, 17:32210 (R;JP)

Babayan, A.Z., Method for the beam intensity measurement in a fast-cycling synchrotron, 17:31499 (RA;JP)

Babcock, L., *See* Chen, W.Y., 17:30544

Babcock, S.M., *See* Wintenberg, A.L., 17:31354

Babich, J.W., *See* Zweit, J., 17:31844

Baca, R.G., Independent verification and benchmark testing of the UNSAT-H computer code, Version 2.0, 17:31697 (R;US)

See Dykhuizen, R.C., 17:32392

Back, B.B., *See* Wuosmaa, A.H., 17:31540, 17:32212

Backstroem, H., Wind energy calculations for Swedish coastal water conditions. Report nr 3, 17:30855 (R;SE;In Swedish)

Baden, A.R., *See* Cords, D., 17:32181

Baer, M.R., *See* Hobbs, M.L., 17:31635

Baeyens, B., *See* Frick, U., 17:31729

Bai Xia, *See* Zhou Quansheng, 17:31868

Bailey, M., Radioactive waste package assay facility. Volume 2. Investigation of active neutron and active gamma interrogation, 17:30689 (R;FR)

Bailey, M.L., *See* Brambley, M.R., 17:31117

Baird, R.J., *See* Gaarenstroom, S.W., 17:31143

Bajard, M., Recent improvements and new possibilities of the Ganil facility, 17:31432 (R;FR)

Baker, C., *See* Priestley, K., 17:32017

Baker, F.T., *See* Morlet, M., 17:32314

Baker, J., *See* Cooper, M.H., 17:30537

Bakir, M.A., *See* Zweit, J., 17:31844

Baktash, C., *See* Lee, I.Y., 17:32243

Bal'butsev, E.B., *See* Bastrukov, S.I., 17:32236

Balachandran, Research program in elementary particle physics, Task A; Outstanding Junior Investigator Program, Task B: Final report, July 1, 1985–December 31, 1991 and Final report, July 1, 1987–December 31, 1991, 17:32066 (R;US)

Balagurov, A.M., A system for experiments automation on the neutron diffractometer DN-2 at the pulsed reactor IBR-2, 17:31578 (R;SU;In Russian)

Neutron diffraction study of $Sr_xBa_{1-x}Nb_2O_6$ crystals, 17:32373 (IA;CS)

Balch, K.S., *See* Avicola, K., 17:32064

Baldassini, P.G., *See* Sciocchetti, G., 17:31653

Baldis, H.A., *See* Kilkenny, J.D., 17:32478

Baldwin, R.M., *See* Shams, K.G., 17:30455

Balestra, F., *See* Arvieux, J., 17:32153, 17:32154

Balint, A.B., Comparing personal alpha dosimetry with the conventional area monitoring-time weighting methods of exposure estimation, 17:31946 (IA;CA)

Baltes, P., The high-energetic component in pion spectra from Au + Au and Ne + NaF at 1 GeV/u$^+$, 17:32297 (IA;DE)

See Senger, P., 17:32296

Bangerter, R.O., *See* Moir, R.W., 17:32471

Banks, J.J., Actuator system history of safety rod lower latch problems review of latch inspection video tapes, 17:31039 (R;US)

Bannon, M., *See* Soukas, A., 17:31477

Barabash, I.P., Hardware for research of transition processes in condensed matter with neutron diffraction method, 17:31616 (R;SU;In Russian)

See Balagurov, A.M., 17:31578

Baranowska-Kortylewicz,, *See* Mariani, G., 17:31817
Barbarics, E., Radiopharmacological studies of a new functionalized isonitrile technetium complex: [Tc(2-ethoxy-2-methylpropylisonitrile)$_6$]$^+$, 17:31824 (RA;US)
Barbashov, B.M., A new exact solution to the classical equations of motion of the relativistic string with massive ends, 17:32104 (R;SU)
Barbieri, A., *See* Stocks, G.M., 17:31215
Barbour, K.L., *See* Paul, P.K., 17:30950
Bardies, M., Development and validation of a simple model for cellular and cell cluster dosimetry with practical application in targeted radionuclide therapy, 17:31907 (RA;US)
Bardin, D.Yu., Calculation of the Higgs boson decay widths into boson pairs, 17:32146 (R;SU;In Russian)
Baribeau, J.M., *See* Jesson, D.E., 17:31268
Barklow, T., *See* Cords, D., 17:32181
Barnard, R.W., TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project, 17:30719 (R;US)
Barnes-Smith, P., *See* Showalter, W.E., 17:30706
Barnett, R.M., Report of the subgroup on the top quark, 17:32152 (R;US)
Barrett, R.T., Research program on the biological effects of oil pollution: Final report, 17:30581 (R;NO;In Norwegian)
Barriere, M.T., *See* Haber, S.B., 17:31001
Barron, W.F., *See* Wilbanks, T.J., 17:31049
Barry, R.F., LEOPARDSPOTS: Spectrum calc with depletion, 17:32533 (CM;US)
Barthold, W.P., *See* Wichner, R.P., 17:30904
Bartholomay, R.C., Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)
Bartke, J., Fluctuations of multiplicities in rapidity windows in sulphur-sulphur collisions at 200 AGeV, 17:32293 (IA;DE)
Bartlett, D.T., *See* Marshall, T.O., 17:31591
Barton, R.A., A comparison of the predictions of the INSPECT reaction set with experimental data, 17:30894 (RA;JP)
Barut, A.O., More on the radiation reaction and runaway solutions in classical electrodynamics, 17:32087 (R;XA)
Barz, H.W., Collisions in an expanding pion gas and the pperpendicular to spectrum in ultrarelativistic heavy ion collisions, 17:32301 (IA;DE)
Basaran, O.A., *See* Wohlhuter, F.K., 17:32049
Basco, J.K., *See* Chow, L.S., 17:30654
Basha, S.G., Modification of γ-induced mutagenesis in Ames test-strains: 1. Radioprotector effect on mutagenesis in Salmonella typhimurium, 17:31961 (RA;SU;In Russian)
  Modification of γ-induced mutagenesis in Ames test-strains: 2. TAN effect on Salmonella typhimurium mutagenesis, 17:31962 (RA;SU;In Russian)
  The effect of the anoxic radiosensitizing agent Tan on induction of revertants by γ-rays and helium ions in salmonella tester strains, 17:31982 (R;SU)
Bassignani, A., Physical and environmental surveillance in uranium exploration galleries, 17:30626 (IA;CA)
Bastrukov, S.I., The isoscalar 4^- and 5^- giant resonances in spherical nuclei, 17:32236 (R;SU;In Russian)
Batchelor, K., The Brookhaven National Laboratory Accelerator Test Facility, 17:31428 (R;US)
Bates, J.L., *See* Chick, L.A., 17:31088
Bates, R.C., Computer modeling of radon transport into underground openings, 17:31723 (IA;CA)
Batha, S.H., *See* Kilkenny, J.D., 17:32478
Batko, G., N-body collisions in high-energy nuclear reactions, 17:32298 (IA;DE)
Batmanova, Eh.G., Direct current transducer, 17:31618 (R;SU;In Russian)
Batmanova, Eh.K., *See* Akhmanov, V.V., 17:31492
Batson, P.J., *See* Koch, J.A., 17:31426
Battiste, R.L., *See* Swinson, W.F., 17:30973
Battistoni, G., *See* Didelez, J.P., 17:32317
Baumann, M.J., Sample Vial Secure Container (SVSC), 17:30648 (R;US)
Baxman, H.R., *See* Sprinkle, J.K. Jr., 17:30768
Baylor, L.R., *See* Uckan, T., 17:32433
Baym, G., *See* Epstein, R.I., 17:32057
Beach, C.M., *See* Zimbrick, J.D., 17:31996
Beahm, E.C., *See* Weber, C.F., 17:30874
Beam, D.C., *See* Andrews, M.K., 17:30743
Beard, A.M., Iodine chemistry in Falcon, 17:30893 (RA;JP)
Bearden, I., *See* Daly, P.J., 17:32272
Bearden, I.G., *See* Grabowski, Z.W., 17:32240
  See Wuosmaa, A.H., 17:31540, 17:32212
Beatty, D., *See* Morlet, M., 17:32314
Beaudoing, G., Measure of water transfers by diffusion and permeation through materials, 17:30656 (R;FR)
  The mass transfers of water by diffusion and permeation through a covering of wastes disposal, 17:30655 (R;FR)
Beaufays, R., *See* Bonne, A., 17:30687
Beaufume, P., *See* Dubois, M.A., 17:32424
Bechade, J.L., Determination of a crystalline orientation distribution function based on inverted poles figures principle for hexagonal crystalline symmetry. Macroscopic physical properties prediction, 17:31206 (R;FR;In French)
Becherrawy, T., *See* Aurenche, P., 17:32121
Bechtold, L.A., *See* Rosocha, L.A., 17:31662
Beck, C., *See* Matsuse, T., 17:32279
Beck, F., *See* Friedrich, R., 17:32223
  See Kirchbach, M., 17:32094
Becker, J.A., *See* Brinkman, M.J., 17:31601
Becker, S.A., Approximating the r-process on earth with thermonuclear explosions, 17:31637 (R;US)
Beckers, H., *See* Bonne, A., 17:30687
Beckman, T.M., *See* Munger, A.C., 17:31633
  See Woods, C.M., 17:31632
Begemann-Blaich, M., *See* Mueller, W.F.J., 17:32291
Begley, J.A., *See* Thomas, J.K., 17:31036
Begmatov, K., *See* Yunucov, M.C., 17:31596
Beiersdorfer, P., *See* Nilsen, J., 17:31423
Beikov, Yu.A., *See* Avramenko, S.A., 17:32331, 17:32332
  See Golokhvastov, A.I., 17:31575
Bell, J.D., *See* Uckan, T., 17:32433
Bell, M., *See* Nagayama, Y., 17:32434
Bell, S.E., Analysis of IMS spectra using neural networks, 17:31318 (R;US)
  Artificial intelligence and neural networks applied to ion mobility spectrometry, 17:31304 (R;US)
Bellini, M.H., *See* Borghi, V.C., 17:31853
Belliveau, J.W., *See* George, J.S., 17:31849
Belyaev, A.L., On-line system for selection and measurement of currents in magnetic elements of beam lines at the JINR phasotron, 17:31434 (R;SU;In Russian)
Belyaev, I.Ya., Effect of millimeter radiation on radiationinduced repair of genome conformation state, 17:31957 (IA;SU;In Russian)
Belyaev, V.B., Algorithm for the solution of the Faddeev equation for a system of three identical spinless particles, 17:32034 (R;SU;In Russian)
  Algorithm of numerical calculations of differential Yakubovsky equations for the (1+3) scattering problem, 17:32035 (R;SU;In Russian)
Ben-Shachar, B., New developments in personal dosimetry, 17:31930 (RA;IL;In Hebrew)
  The minimum measurable dose of the sensitive Harshaw TLDs, 17:31589 (RA;US)
Ben-Zvi, I., The BNL Accelerator Test Facility and experimental program, 17:31429 (R;US)
Benet, P., *See* Daly, P.J., 17:32272
Bengtsson, M., Final report of ICCP-activity, stage 5, 17:30474 (R;SE;In Swedish, English)
Benguerba, M., Impact of slow gold clusters on various solids: Non linear effects in secondary ion emission, 17:32377 (R;FR)
Benjamin, T.G., *See* Remick, R.J., 17:31085
Bennett, C.K., *See* Nelson, M.B., 17:32473
Bennett, D., *See* Singh, N.P., 17:31949
Bennett, D.W., *See* Sandness, G.A., 17:30715
Bennett, E.F., *See* Porges, K.G., 17:32437

Bennett, J.T. Espinosa,, Waste management in an environmental chemistry laboratory, 17:30686 (R;US)

Bennett, M., *See* Catalano, A., 17:30821

Bennett, P.J., *See* Beard, A.M., 17:30893

Bennett, R.M., Structural testing of clay tile walls testing and evaluation program, 17:31284 (R;US)

Bennhold, C., Polarization observables in meson photoproduction, 17:32308 (RA;FR)

Benson, C.G., Activities of the Commission of the European Communities in the area of iodine chemistry in severe reactor accidents, 17:30871 (RA;JP)

Benton, D., *See* Whitlow, L.W., 17:32183

Benton, R.D., *See* Phillip, T., 17:31076

Beranger, M., *See* Duret, D., 17:31289

Berard, A., *See* Grandati, Y., 17:32072

Berg, F.D., *See* Ostendorf, R., 17:32253

Berger By, G., *See* Litaudon, X., 17:32423

Berger, R.L., *See* Rapp, D.M. Ehrlinger, H.P., 17:30426

Berggren, H., *See* Jansson, M., 17:31758

Berglund, S., Heating and cooling with low-temperature water: Prerequisities, experiences, possibilities, 17:31145 (R;SE;In Swedish)

Bergman, M., Application of probabilistic fracutre mechanics to allocation of NDT for nuclear pressure vessels, 17:30949 (R;SE)

Bergstroem, K., *See* Hiltunen, J.V., 17:31914
See Nikula, T.K., 17:31792

Berk, H.L., Fusion, magnetic confinement, 17:32421 (R;US)

Bernas, M., Investigation of very neutron rich isotopes towards ^{78}Ni: why and how, 17:32228 (R;FR)

Berrendorf, R., Memory access in shared virtual memory, 17:32502 (R;US)

Berrier-Ronsin, G., *See* Hourani, E., 17:32248

Berry, G.F., Method and apparatus for transporting liquid slurries, 17:30536 (PA;US)

Berryman, J.G., Mechanics of inhomogeneous rock: The two-constituent porous medium paradigm, 17:31281 (R;US)

Bertini, R., *See* Arvieux, J., 17:32153, 17:32154

Bertsch, G., *See* Barz, H.W., 17:32301

Beshtoev, Kh.M., On the problem of enhancement of neutrino oscillation in matter, 17:32165 (R;SU)

Beskid, N.J., Applied research and development private sector accomplishments: FY90 contracts, 17:31061 (R;US)

Bessis, D., Moment problem formulation of the Schroedinger equation, 17:32019 (R;FR)

Betak, E., The pre-equilibrium picture of nucleon radiative capture and the neutron-to-gamma competition: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32283 (R;NL)

Bethge, K., Application of the Rutherford backscattering analysis (RBS analysis) for detecting heavy impurity elements in pBN crucible materials. Final report, 17:31298 (I;DE;In German)
The nuclear reaction analysis (NRA) as a means for detecting carbon in GaAs and in source materials and additives. Final report, 17:31299 (I;DE;In German)

Betts, R.R., *See* Wuosmaa, A.H., 17:31540, 17:32212

Bevilacqua, G., *See* Mariani, G., 17:31817

Beyec, Y. Le, Ion desorption phenomena induced by various types of multiply charged projectiles and by photons on solid surfaces, 17:32378 (R;FR)
See Benguerba, M., 17:32377

Beyer, G.J., *See* Schomaecker, K., 17:31783

Beyth, M., *See* Stern, R.J., 17:31707

Bezbaruah, R., *See* Gidaspow, D., 17:30530

Bezzerides, B., America's best: Outstanding state energy grant projects, 17:31064 (R;US)

Bhattacharjee, A., *See* Jardin, S.C., 17:32403

Bi Shuxun, *See* Li Rizhu, 17:30970

Bianchi, N., *See* Anghinolfi, M., 17:31530

Bibet, P., *See* Litaudon, X., 17:32423

Bickel, T.C., *See* Dykhuizen, R.C., 17:32392

Bieber, A.M. Jr., The IAEA system and experience as a model for Information Management under the Chemical Weapons Convention, 17:31196 (R;US)

Bieri, R.L., Inertial confinement fusion driver enhancements: Final focusing systems and compact heavy-ion driver designs, 17:32472 (R;US)
See Moir, R.W., 17:32471

Bigelow, T.S., *See* Uckan, T., 17:32433

Bigu, J., Non-steady state radiation mine models: Practical applications to personal dosimetry and environmental monitoring, 17:30629 (IA;CA)
Removal or airborne thoron (radon) daughters on mine walls and other surfaces by convective deposition and electrostatic plate-out, 17:30622 (IA;CA)
See Roze, V., 17:30617

Bihl, D.E., Experience with NQA-1 quality assurance standards applied to in vitro bioassay, 17:31990 (RA;US)
See Lyon, M., 17:31994

Billinghurst, M.W., Pertechnetate solutions: Their history and the labelling of HMPAO, 17:31790 (RA;US)
The preparation and biodistribution of secondary Tc-HMPAO, 17:31779 (RA;US)

Billoire, A., Monte Carlo simulations in theoretical physic, 17:32018 (R;FR;In French)

Billone, M.C., Modeling of tritium behavior in Li_2O, 17:32438 (R;US)

Bilwes, B., *See* Mau, N.V., 17:32318
See Stuttge, L., 17:32280

Bilwes, R., *See* Stuttge, L., 17:32280

Bimbot, L., *See* Morlet, M., 17:32314

Binder, J.L., Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows, 17:31383 (RA;US)

Biner, S.B., Ductile fracture process of discontinuous fiber reinforced composites, 17:31272 (R;US)
Simulation of forward-backward extrusion with numerical and model material techniques, 17:31231 (R;US)

Binetruy, P., Linear supermultiplets and non-holomorphic gauge coupling functions, 17:32119 (R;FR)

Bingham, C.R., *See* Toth, K.S., 17:32244

Bingham, F.W., *See* Barnard, R.W., 17:30719

Binz, H., *See* Hoffschir, D., 17:31769

Birch, C., *See* Cholewa, M., 17:31852

Biro, T.S., *See* Kalmbach, U., 17:32160

Bishop, A.R., *See* Bronold, F., 17:32361

Bishop, K.P., *See* Milner, L.M., 17:31419

Bitner, D.M., Enhanced tumor imaging with PokeWeed Mitogen, 17:31820 (RA;US)

Bizarro, J.P., *See* Litaudon, X., 17:32423

Bjoerklund, R.B., Conductivity measurements on dolomite at reaction conditions, 17:30804 (R;SE)

Bjoerkman, E., Quantum chemical methods of V_2O_5-TiO_2 catalysts, 17:31666 (R;SE;In Swedish, English)

Bjure, J., *See* Vestergren, E., 17:31904

Black, D., 1992 Report on Hanford Site land disposal restrictions for mixed wastes, 17:30779 (R;US)

Blackburn, R., *See* Markley, F., 17:31603

Blaettel, B., *See* Maruyama, T., 17:32306

Blaha, V., Clearance curve analysis of extravascularly distributed radiopharmaceuticals, 17:31809 (RA;US)

Blain, M., *See* Milner, L.M., 17:31419

Blain, M.G., *See* Benguerba, M., 17:32377

Blaine, R.A., AILMOE: X-section calc elastic scat resonances, 17:32541 (CM;US)
AISITE2: Parametric site requirement study, 17:32530 (CM;US)

Blais, N.C., *See* Greiner, N.R., 17:31631

Blaizot, J.P., Quantum fields at finite temperature and density, 17:32070 (R;FR)

Blanc, J.Y., Study of zirconium/stainless steel interface in tubular junctions made by eutectic diffusion, 17:31205 (R;FR)

Blanchat, T.K., *See* Allen, M.D., 17:30899

Blanco, D., *See* Montanez, O., 17:31992

Blanco, J., *See* Lopez, J.V., 17:31026

Bland, L.C., *See* Arvieux, J., 17:32153, 17:32154

Blanpied, G., *See* Didelez, J.P., 17:32317

Blashchak, Z., The experimental setup for optical spectra measurements with a pulsed laser, 17:31579 (R;SU;In Russian)

Blaskiewicz, M., Longitudinal impedance of capacitive pick-up electrodes: Calculations and comparison with measurements, 17:31474 (R;US)

Blau, Matthias, The Mathai-Quillen formalism and topological field theory, 17:32125 (R;NL)

Bleier, A., *See* Hellmann, S., 17:30945

Bleser, E., *See* Ahrens, L., 17:31476

Bloch, J.J., The ALEXIS experiment: Current status and performance, 17:32054 (R;US)

Blohm, M.W., *See* Hoekstra, P., 17:30561

Bloise, C., *See* Didelez, J.P., 17:32317

Blok, H.P., Study of few-body systems using recoil detection, 17:32262 (RA;FR)

Blomquist, R.A., *See* Pelton, A.D., 17:31204

Blomqvist, J., *See* Daly, P.J., 17:32272

Blondel, A., Higgsometry from Ultimate LEP, 17:32200 (R;FR)

Bloom, E., *See* Bulos, F., 17:31522

Bloomsburg, M.S., Technical Section Coordinating Committee meeting, 17:30978 (R;US)

Blumhardt, R., *See* Phillips, W.T., 17:31815

Boaretto, E., *See* Herut, B., 17:31704

Bobias, S.G., *See* Reedy, R.C., 17:32251

Bobryshev, M.L., *See* Bastrukov, S.I., 17:32236

Bocquet, J.P., Grenoble contribution to the GRAAL collaboration, 17:32312 (RA;FR)

Bodek, A., *See* Whitlow, L.W., 17:32183

Bodily, D.M., *See* Hucka, V.J., 17:30470

Boergesson, L., *See* Pusch, R., 17:30733, 17:31738

Boffi, S., Nucleon recoil polarization in quasi-elastic electron scattering with two-body currents, 17:32264 (RA;FR)

Bogomolny, E.B., Semiclassical quantization of multidimensional systems, 17:32027 (R;FR)

Bogoslovsky, G.Yu., From the Weyl theory to a theory of locally anisotropic space-time, 17:32099 (R;SU)

Bohigas, O., Random matrix theories and chaotic dynamics, 17:32024 (R;FR)

Bohlke, B.M., Institutional obstacles to the development of Maglev in the United States, 17:31184 (RA;US)

Bohrman, D.E., Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117, 17:30753 (R;US)

Bolander, T.W., Risk assessment technique for evaluating research laboratories, 17:32007 (R;US)

Bolch, W.E., *See* Liu, J.C., 17:31896
See Shearer, T.W., 17:31895
See Wilson, L.A., 17:31898

Bolme, G.O., *See* Johnson, K.F., 17:31512, 17:31513

Bolton, P.R., *See* Eder, D.C., 17:31425

Bonasera, A., *See* Colonna, M., 17:32302

Bonev, M.N., Post-irradiation DNA degradation in certain repair-deficient E.Coli strains, 17:31965 (RA;SU)

Bongianni, W.L., *See* Williams, J.M., 17:31638

Bonilla, J., *See* Moreno, E., 17:31863

Bonne, A., The HADES demonstration and pilot project on radioactive waste disposal in a clay formation, 17:30687 (R;FR)

Booij, A.S., *See* Konings, R.J.M., 17:31227

Boonsang, V., *See* Wongwatcharadumrong, R., 17:31861

Boonstra, A.L., *See* Ostendorf, R., 17:32253

Booth, S.R., *See* Showalter, W.E., 17:30706

Booth, T.E., A caution on reliability using "optimal" variance reduction parameters, 17:32349 (R;US)

Booz, J., *See* Feinendegen, L.E., 17:31878

Borak, T.B., Randomization of grab sampling strategies for estimating the exposure of uranium miners to radon daughters, 17:30615 (IA;CA)

Borderie, B., *See* Jouan, D., 17:32313

Borghi, V.C., Production of biological reagents for radioimmunoassay second antibody, 17:31853 (R;BR;In Portuguese)

Borgstroem, M., Measuring equipment to determine the status of polyethylene pipes, 17:31275 (R;SE;In Swedish)

Borhani, K.J., Acid copper sulfate plating bath: Control of chloride and copper: Final report, 17:31320 (R;US)

Borisov, O.N., Calculation of the beam extraction system from the U-120K cyclotron, 17:31489 (R;SU;In Russian)

Borkowski, J.A., TRAC-BF1/MOD1 models and correlations, 17:31021 (R;US)

Bormann, C., *See* Senger, P., 17:32296

Bornec, Y. Le, *See* Tatischeff, B., 17:32315

Borovikova, N.V., Production of the mirror foil for the ultracold neutron guides, 17:32351 (R;SU;In Russian)

Borovkov, D.P., Radio-frequency linear ion accelerator (proposal for development of the acceleration for ion beam implantation), 17:31437 (R;SU;In Russian)

Borromeo, M., *See* Hjort-Jensen, M., 17:32270

Borroto Valdes, M., Shielding chalculations in x-rays installations for medical diagnosis. description of the method and computational solution, 17:30782 (I;CU;In Spanish)

Boschi Filho, H., Chiral Schwinger model at finite temperature, 17:32088 (R;XA)

Bossart, P., *See* Frick, U., 17:31729

Bossart, R., Beam position monitor using a reentrant coaxial cavity, 17:31496 (RA;JP)

Bossolasco, S., *See* Arvieux, J., 17:32154

Bosted, P., *See* Whitlow, L.W., 17:32183

Bostick, D.T., The isolation of lutetium from gadolinium contained in Purex process solutions, 17:30643 (R;US)

Bottaro, J., *See* Hirschon, A.S., 17:30453

Bottlaender, M., Interaction of triazolam with central type benzodiazepine receptors studied in living baboons using positron emission tomography, 17:31798 (RA;US)
See Brouillet, E., 17:31799

Botton, N. de, Measuring the Drell-Hearn-Gerasimov sum-rule, 17:32267 (RA;FR)

Bottoni, M., Development and verification of an anisotropic turbulence model in the COMMIX-1C/ATM computer code, 17:32363 (R;US)
The three-dimensional transient two-phase flow computer programme BACCHUS-3D/TP, 17:31395 (R;DE)

Boucher, H., *See* Villegier, J.C., 17:31251

Boudrie, R.L., *See* Jackson, H.E., 17:31471

Bougeault, R., *See* Stuttge, L., 17:32280

Bourdillon, A.J., Magnetic shielding in Maglev, 17:31167 (RA;US)

Bouska, P., Corrosion problems of materials for mechanical, power and chemical engineering: National conference, 17:31230 (I;CS;In Czech, Slovak)

Boutaleb J, H., General scalar-tensor theories for induced gravity inflation, 17:32081 (R;XA)

Bouvier, A., *See* Vacher, J., 17:31771

Bouzhik, Eh., X-radiation and hydrogen peroxide induce adaptation of lymphocytes of man peripheral blood to subsequent x-irradiation, 17:31972 (RA;SU;In Russian)

Bovet, E., *See* Didelez, J.P., 17:32317

Bower, C., Indiana University High Energy Physics Group, Task C: Technical progress report, January 1, 1992–October 31, 1992, 17:32069 (R;US)

Bowick, M., *See* Balachandran, 17:32066

Bowser, S.E., Human perceptual deficits as factors in computer interface test and evaluation, 17:31623 (R;US)

Bowsher, B.R., The kinetics of reaction between iodine vapour and bulk-material aerosols, 17:30872 (RA;JP)
See Beard, A.M., 17:30893

Boyarski, A.M., *See* Cords, D., 17:32181

Boyd, G., Hadronic and quark screening lengths from lattice QCD, 17:32140 (IA;DE)

Boyer, J., *See* Cords, D., 17:32181

Boyle, C.C., Hepatic uptake of a radiolabeled monoclonal antibody is not receptor-mediated, 17:31803 (RA;US)

Bozek, P., Finite size effects in the intermittency analysis of the fragment-size correlations, 17:32252 (R;FR)
Finite-size scaling in the multiparticle production, 17:32156 (R;FR)
Intermittency in the particle production and in the nuclear multifragmentation, 17:32132 (R;FR)

Brachet, J.C., 9Cr-1Mo martensitic alloys: effects of the nitrogen, niobium and vanadium additions on the microstructure, phase transformations and mechanical properties, 17:31211 (R;FR;In French)

Bradbury, M.H., *See* Frick, U., 17:31729

Bradley, D.J., Radioactive waste management in the USSR: A review of unclassified sources: Volume 2, 17:30711 (R;US)

Bradley, K.F., *See* Thiyagaragjan, P., 17:31539

Bradley, R.P., The development, introduction and early operating experience of a large scale external gamma monitoring program in Canadian uranium mines, 17:30616 (IA;CA)

Brady, J.F., *See* Nott, P.R., 17:30532

Brady, M.C., *See* England, T.R., 17:32339

Brambley, M.R., An integrated environment for intelligent energy design, 17:31117 (R;US)

Bramson, G., *See* Jong, R.A., 17:32475

Brand, J.F.J. van den, Measurement of spin-dependent electron scattering from a polarized ^{3}He internal target, 17:32263 (RA;FR)

Brandin, A.B., *See* Borovikova, N.V., 17:32351

Brandt, R., *See* Psarros, N., 17:30641

Brase, J., *See* Avicola, K., 17:32064

Braun-Munzinger, P., Experimental considerations to measure thermal photons at RHIC, 17:32288 (IA;DE)

Brayman, C.L., *See* Sullivan, J.D., 17:32445

Brechbiel, M.W., *See* Hay, R.V., 17:31892

Breidenbach, M., *See* Cords, D., 17:32181

Bremner, W.B., Survey of EEC solid waste arisings and performance of non-destructive assay systems, 17:30695 (R;FR)

Brener, S., Supervising radiation protection in Israel: A new arrangement, 17:32577 (RA;IL;In Hebrew)

Brennan, J.M., The RF beam control system for the Brookhaven AGS synchrotron, 17:31475 (R;US)
  See Ahrens, L., 17:31476

Brenot, J., *See* Tirmarche, M., 17:31935

Bretscher, M.M., *See* Porges, K.G., 17:32437

Brewer, K.N., Calciner Pilot Plant waste minimization practices at the ICPP, 17:30742 (R;US)

Brewster, B.S., Structure of a near-laminar coal jet flame, 17:30542 (RA;US)

Brienson, Sh., *See* Mikhajlov, I.N., 17:32237

Brickstad, B., *See* Bergman, M., 17:30949

Briggs, D., Low frequency transverse resistive instability in the collider, 17:31467 (R;US)
  Prompt bunch by bunch synchrotron oscillation detection via a fast phase measurement, 17:31497 (RA;JP)

Briggs, M.R., In-mine evaluation of continuous radon and working level detectors, 17:31555 (IA;CA)

Brigham, W.E., *See* Demiral, B.M.R., 17:30569

Brigham, W.P., *See* Sweatt, W.C., 17:31634

Brill, A.B., *See* Hnatowich, D.J., 17:31831

Brill, D., *See* Senger, P., 17:32296

Brinkman, M.J., A lossless one-pass sorting algorithm for symmetric three-dimensional gamma-ray data sets, 17:31601 (R;US)

Brissaud, I., *See* Arianer, J., 17:31485

Brittain, D., *See* Regan, A.H., 17:31515

Britton, C.L. Jr., *See* Wintenberg, A.L., 17:31354

Brizard, C., Development of a programmable CCD detector for imaging, real time studies and other synchrotron radiation applications, 17:31551 (R;FR;In French)

Brochard, F., *See* Arvieux, J., 17:32153, 17:32154

Brocious, W., *See* Yoo, C.S., 17:31283

Broda, R., *See* Daly, P.J., 17:32272
  See Grabowski, Z.W., 17:32240

Brodersen, K., *See* Majborn, B., 17:32500

Brodsky, N.S., *See* Pfeifle, T.W., 17:30721

Broend, S., *See* Schleisner, L., 17:31149

Bronold, F., Interchain coupling and 3D modeling of trans-polyacetylene, 17:32361 (R;US)

Brooks, A.L., The role of cellular and molecular studies in evaluation of health effects from combined radiation and chemical exposures, 17:31997 (R;US)

Brooks, J.N., *See* Nygren, R.E., 17:32470

Brouillet, E., Intrinsic efficacies of benzodiazepine receptor ligands evaluated in vivo by positron emission tomography in the primate brain, 17:31799 (RA;US)
  See Bottlaender, M., 17:31798

Brow, R.K., Bonding in simple phosphate glass, 17:31279 (R;US)

Brown, A.P., *See* Kucera, G.H., 17:31078

Brown, D., Status and prospects for hot dry rock (HDR) in the United States, 17:30837 (R;US)

Brown, D.M., Liquid Phase Methanol LaPorte PDU: Modification, operation, and support studies: Quarterly technical progress report No. 4, 1 April–30 June 1988, 17:30452 (R;US)

Brown, G.Z., *See* Brambley, M.R., 17:31117

Brown, S., *See* Johnson, K.F., 17:31512

Brown, S.K., *See* Wright, R.M., 17:31506

Brownell, G.L., *See* Nguyen, T., 17:31774

Brudanin, V.B., *See* Egorov, V.G., 17:32249

Brunelle, A., *See* Benguerba, M., 17:32377

Bruns, R.J., *See* Snow, S.L., 17:31414

Bruyn, D. de, *See* Bonne, A., 17:30687

Bryant, L. Jr., *See* Korzekwa, D.R., 17:31236

Buch, E., *See* Aarkrog, A., 17:31730

Buchanan, D.H., *See* Chou, M.I.M, 17:30458

Buchanan, M.V., *See* Jenkins, R.A., 17:31642

Buchenauer, D.A., *See* Jong, R.A., 17:32475

Buchnev, V.N., Data bank of individual dosimtry control in the JINR, 17:31956 (R;SU;In Russian)

Buckius, R.O., Cooperative research on the combustion characteristics of cofired desulfurized Illinois coal and char with natural gas: Technical report, December 1, 1991–February 29, 1992, 17:30551 (R;US)

Buckley, G.D., Aging assessment of BWR standby liquid control systems, 17:30962 (R;US)

Buckner, M.A., Advancement and application of bubble detector technology, 17:31590 (RA;US)

Buckner, M.R., Statistical process management: An essential element of quality improvement, 17:32501 (R;US)

Buden, D., A development approach for nuclear thermal propulsion, 17:30914 (R;US)

Budge, K.G., Optimization of expressions involving array classes, 17:32563 (R;US)
  RHALE: A MMALE shock physics code written in C++, 17:32562 (R;US)

Budny, R.V., *See* Nagayama, Y., 17:32434

Bue Larsen, G., Fitting catalytic converters on cars, 17:31664 (I;DK;In Danish)

Bueckers, D., Medium effects on quark and meson masses, 17:32191 (IA;DE)

Buehler, C., *See* Frick, U., 17:31729

Buelow, S.J., *See* Dyer, R.B., 17:31630

Bugge, L., Absolute in situ energy calibration of luminosity calorimeters in the DELPHI experiment at LEP, 17:31598 (R;NO)
  See Myrheim, J., 17:32560

Buisson, C., Detection of single photons in the L3 experiment, 17:31586 (R;FR;In French)

Buklet, B.G., *See* Dave, R.N., 17:30534

Buklanov, G.V., Electrochemical etching of fission fragment tracks in dielectric detectors for use in chemical experiments with transplutonium elements, 17:31302 (R;SU;In Russian)

Bulgadaev, S.A., On one-dimensional topological and conformal field theories, 17:32084 (R;XA)

Bulos, F., Optimizing the injection straight of PEP II asymmetric B Factory at SLAC, 17:31522 (R;US)

Bultman, J., Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor, 17:30685 (R;NL)

Bunce, L.J., *See* Bailey, M., 17:30689

Bundy, K., *See* Meadley, T., 17:30613

Buniatian, A.Yu., *See* Adamian, F.V., 17:32310

Burchat, P.R., *See* Cords, D., 17:32181

Burgess, P.H., *See* Marshall, T.O., 17:31591

Burgio, G.F., *See* Randrup, J., 17:32254

Burke, D.L., *See* Cords, D., 17:32181

Burks, B.L., Remote excavation using the telerobotic small emplacement excavator, 17:31355 (R;US)
  See Noakes, M.W., 17:31353

Burns, W.G., A new chemical model for the removal of iodine vapour from a reactor containment by aqueous sprays, 17:30876 (RA;JP)

Buron, J.M., The kinetic behaviour of iodine and cesium under severe accident conditions, 17:31342 (RA;JP)

Burris, J.A., *See* Southworth, G.R., 17:31726

Bursey, G., *See* Gale, J., 17:31745
Bush, W.R., Problems in setting and applying limits for occupational exposure to radon daughters, 17:30621 (IA;CA)
Bussa, M.P., *See* Arvieux, J., 17:32154
Butler, F., *See* Cords, D., 17:32181
Butler, H.S., *See* Swain, G.R., 17:31461
Butler, P.L., *See* Wintenberg, A.L., 17:31354
Buttazoni, J.B., *See* Kupferschmidt, W.C.H., 17:30943, 17:30944, 17:31340
Buttle, D., *See* Naish, C.C., 17:30691
Button-Shafer, J., *See* Whitlow, L.W., 17:32183
Buyens, M., *See* Bonne, A., 17:30687
Bystritskij, V.M., Investigation of hydrogen permeability of protective coating for high-temperature alloy EI698, 17:31232 (R;SU;In Russian)
See Artyukhov, V.I., 17:32429, 17:32430, 17:32431

C

Cable, M.D., *See* Kilkenny, J.D., 17:32478
See Nelson, M.B., 17:32473
Cabot, C., *See* Jouan, D., 17:32313
Cabrejos, F., *See* Cooper, M.H., 17:30537
Cadalbert, R., *See* Godlewski, J., 17:31208
Cadwallader, L.C., Investigation of component failure rates for pulsed versus steady state tokamak operation, 17:32455 (R;US)
Calhoun, J.M., *See* Coursey, B.M., 17:31884
Calo, J.M., Characterization of porosity via secondary reactions: Quarterly technical progress report, 15 December 1991–15 March 1992, 17:30473 (R;US)
Camera, L., *See* Kinuya, S., 17:31806
Camp, D.W., A system for destroying mixed and hazardous wastes with no gas or liquid effluents, 17:30737 (R;US)
Campbell, C.S., Fluidization of particles in horizontal slurry flow, 17:30520 (RA;US)
Campbell, E.M., *See* Kilkenny, J.D., 17:32478
Campbell, J.I., *See* Marshall, T.O., 17:31591
Campbell, L.J., *See* Bartholomay, R.C., 17:31752
Campbell, R.B., *See* Allen, S.L., 17:32474
Campos, E., *See* Leon, A., 17:31818
Canada, T.R., *See* Sprinkle, J.K. Jr., 17:30768
Canellas, C.O., An animal model for radiopharmaceutical research (Didelphis albiventis) in HM-PAO-Tc-99m use, 17:31843 (RA;US)
Canfield, T.R., Thermal effects on the frequency response of piezoelectric crystals, 17:31265 (R;US)
Canton, M.H., *See* Cooper, M.H., 17:30537
Cao Genfa, *See* Zhu Shoupeng, 17:31877
Cao Xiaowen, Flux creep in fluorine-doping Bi-Pb-Sr-Ca-Cu-O bulk superconductor, 17:32384 (R;CN;In Chinese)
Cao Xuewu, A probabilistic safety assessment of in-pile test loop in HWRR, 17:30887 (R;CN)
Capitain, J.J., *See* Litaudon, X., 17:32423
Caprihan, A., *See* Altobelli, S.A., 17:30519
See George, J.S., 17:31849
Cardenas, R., *See* Oliva, J.P., 17:31834
Carlberg, S.R., *See* Andersson, Lars, 17:31756
Carleson, T.E., Growth kinetics for the precipitation of zirconium hydroxide from aqueous zirconium and tin bearing solutions by the addition of ammonium hydroxide, 17:30741 (R;US)
Carlos, R.C., Geostationary-satellite beacon-receiver array for studies of ionospheric irregularities, 17:32052 (R;US)
Carlqvist, P., Manifestations of electric currents in interstellar molecular clouds, 17:32063 (R;SE)
Carlson, B.M., Speedup properties of phases in the execution profile of distributed parallel programs, 17:32512 (R;US)
Speedup properties of phases in the execution profile of distributed parallel programs, 17:32558 (R;US)
Carlson, R.E., DATA: How to generate, store, retrieve, communicate, and interpret it: Proceedings, 17:32510 (R;US)
Carlsten, S., Site characterization and validation - monitoring of head in the Stripa mine during 1991, 17:31737 (R;SE)
Carman, L.M., *See* Wijensinghe, A.M., 17:30734
Carpenter, J.M., *See* Egelstaff, P.A., 17:30781
See Thiyagaragjan, P., 17:31539
Carpenter, M., *See* Daly, P.J., 17:32272
Carpenter, M.P., *See* Grabowski, Z.W., 17:32240
Carpenter, S.H., *See* Armentrout, D.L., 17:31239
Carr, W.N., *See* Rosato, A.D., 17:30523
Carrasco, J., *See* Litaudon, X., 17:32423
Carrasquillo, J.A., *See* Kinuya, S., 17:31806
Carreras, B.A., *See* Lynch, V.E., 17:32405
Carter, H.K., *See* Mantica, P.F., 17:32245
Carter, R.J., Advanced control room design review guidelines: Merging old and new, 17:30956 (R;US)
Carty, R.H., *See* Knight, R.A., 17:31296
Carvalho, S.M., Radiation safety aspects of occupational areas at a Brazilian open-pit mine, 17:30610 (IA;CA)
Carwardine, J.A., *See* Pile, G.D., 17:31472
Casas I Garcia, J., Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes, 17:30699 (R;FR;In French)
Cash, R.J., Fiscal year 1992 program plan for evaluation of ferrocyanide in the Hanford Site waste tanks: Revision 2, 17:30739 (R;US)
Caskey, D.L., The problem with security: Public perception versus reality, 17:32485 (R;US)
Cassidy, K., *See* Wang, F., 17:30738
Cassing, W., *See* Maruyama, T., 17:32306
Cassiolato, A.M., *See* Melo, I.S., 17:31923
Casson, W., *See* Miller, L.F., 17:31993
Casson, W.H., *See* Buckner, M.A., 17:31590
Cassulo, J.C., *See* Gabor, J.D., 17:30997
Castaneda Donate, S., Calchulation of physical parameters of the subcritical assembly located in the higher Institute of Nuclear Sciences and Technology, 17:30939 (I;CU;In Spanish)
Castanheira, I., Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)
Castanier, L.M., *See* Demiral, B.M.R., 17:30569
See Hornbrook, J.W., 17:30568
Castellani, R., Matching asynchronous generators to small windmills, 17:30857 (I;DK)
Castro, R.G., Ductile phase toughening of molybdenum disilicide by low pressure plasma spraying, 17:31258 (R;US)
Castronovo, F.P. Jr., Radiopharmacology of inhaled Xe-133 in skeletal sites containing deposits of Gaucher cells, 17:31795 (RA;US)
Catalano, A., Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992, 17:30821 (R;US)
Catara, F., Electromagnetic decay of two-phonon states, 17:32247 (R;FR)
Cavallo, A., *See* Nagayama, Y., 17:32434
Ceccatto, H.A., Nonclassical disordered phase in the strong quantum limit of frustrated antiferromagnets, 17:32389 (R;XA)
Cedeno, W., Dynamic multimodal function optimization using genetic algorithms, 17:32567 (R;US)
Cei, A., *See* Mariani, G., 17:31817
Cekic, M., *See* Hokin, S., 17:32413
See Prager, S.C., 17:32412
Cena, R.J., HRS pilot plant and modeling results, 17:30601 (R;US)
See Aldis, D.F., 17:30602
Cervantes, P., *See* Gonzalez Mateu, D., 17:31543
Cessna, J., *See* Coursey, B.M., 17:31884
Chadwick, M.B., *See* Young, P.G., 17:32269
Chafetz, H.S., Bacterially induced precipitation of $CaCO_3$: An example from studies of cyanobacterial mats: Final report, 17:31645 (R;US)
Chaffron, L., Electrical and microstructural characterization of silver sheathed high T_c superconductors wires and ribbons, 17:31249 (R;FR)
Chaiko, D.J., Measurements of $Al(NO_3)_3$ activities in aqueous nitrate solutions, 17:31310 (R;US)
Chaix, P., The finite temperature QED vacuum, within the mean field approximation, 17:32129 (R;FR;In French)
Chakrabarti, M., *See* Cheng, K.T., 17:31836
Chalabreysse, J., *See* Henge-Napoli, M.H., 17:31989

Chalupnik, S., *See* Lebecka, J., 17:31722
Chambers, D.B., *See* Mernagh, J.R., 17:30630
Chambon, B., *See* Desesquelles, P., 17:32268
Chameaud, J., Lung cancer induction in rats by radon daughter exposure: Status as of 1984 on low doses effects, 17:31931 (IA;CA)
See Tirmarche, M., 17:31935
Chan, B.C., An improved numerical model for the investigation of thermal hydraulic phenomena with applications to LMR reactor components, 17:30911 (R;US)
Chan, G.L.Y., Analysis of [F-18]-L-6-fluorodopa and metabolites in plasma for PET studies, 17:31845 (RA;US)
Chance, M.S., *See* Jardin, S.C., 17:32403
Chang Tieqiang, *See* Zhang Jiatai, 17:31482
Chang, C.H., *See* Stickler, L.A., 17:31160
Chang, F.C., *See* Bottoni, M., 17:32363
Chapman, B., *See* Hokin, S., 17:32413
Chapman, B.E., *See* Prager, S.C., 17:32412
Chapman, J.D., *See* Wiebe, L.I., 17:31915
Charbonneau, B.W., Gold occurrence in radioactive calc-silicate float at Sandybeach Lake, Nueltin Lake area, District of Keewatin, 17:30607 (RA;CA)
Chartas, G., *See* Hokin, S., 17:32413
Chason, E., Uses of Monte Carlo computer simulations in understanding epitaxial growth and ion bombardment of Si(001), 17:31278 (R;US)
Chauvenet, B., *See* Morel, J., 17:31291
Chaven, C., *See* Chou, M.I.M, 17:30458
Chavoix, C., *See* Brouillet, E., 17:31799
Chawla, R., Irradiation techniques employed at the 10 MW$_{th}$ SAPHIR reactor, 17:30995 (R;CH)
Chen Bingxian, The technology and application study of NTD CZ silicon for pressure sensing elements, 17:31602 (R;CN;In Chinese)
Chen Daolong, Thermocouple calibration facility for 2900 deg C high temperature and its applications, 17:31607 (R;CN;In Chinese)
Chen Dianshan, The in-pile proving test for fuel assembly of Qinshan nuclear power plant, 17:30881 (R;CN;In Chinese)
Chen Dongquan, *See* Liu Hairui, 17:32048
Chen Guanghan, *See* Chen Dianshan, 17:30881
Chen Kangwei, *See* Duan Shuyun, 17:32401
Chen Rongguang, *See* Li Caiyun, 17:32383
Chen Xiaomei, The effects of ^{60}Co γ-ray irradiation on the cytoskeleton of mouse peritoneal macrophages and human peripheral blood monocytes in vitro, 17:31873 (R;CN;In Chinese)
Chen Xiulan, *See* Yang Hefeng, 17:31855
Chen Yongqing, *See* Zhang Qinfen, 17:30638
Chen, E.P., Numerical simulations of steel plate perforation, 17:31241 (R;US)
Chen, Gengsheng, *See* Smalinskas, K., 17:31202
Chen, H.Y., TCP performance analysis for wide area networks, 17:32564 (R;US)
Chen, K.R., Fast ion-driven Bernstein instabilities, 17:32418 (R;US)
Chen, L., *See* Catalano, A., 17:30821
Chen, Q., An assessment of ^{238}Pu and $^{239+240}$Pu in the primary cooling water of a PWR, 17:30898 (R;DK)
Chen, Q.J., *See* Aarkrog, A., 17:31730
Chen, R., *See* Yang, S.L., 17:30866
Chen, R.C., *See* Wildman, D.J., 17:30521
Chen, Shuh Rong, *See* Kocks, U.F., 17:31235
Chen, W.Y., Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988, 17:30544 (R;US)
Cheng Liangcheng, Experimental research on flow resistance in piping components under natural circulation condition, 17:31379 (R;CN;In Chinese)
Cheng Mangeng, *See* Zhou Quansheng, 17:31868
Cheng Shiqing, *See* Duan Shuyun, 17:32401
Cheng, A.C.H., [In-situ permeability determination and fracture characterization using elastic waves]: Progress report, 17:30562 (R;US)
Cheng, H.S., Analysis of PIUS reactor passive shutdown using PC-based model, 17:31003 (R;US)
Cheng, K.T., I-131 anti-Ama monoclonal antibody for radioimaging of atheromas, 17:31836 (RA;US)
Cheng, Yuanda, *See* Rosen, R.S., 17:31244
Cheong, S.W., *See* Hayden, S.M., 17:32387
Chepurnoj, A.I., Kinetics of formation of induced mutants of Saccharomyces cerevisiae, 17:31966 (RA;SU;In Russian)
Chernikov, N.A., The system whose Hamiltonian is a time-dependent quadratic form in coordinates and momenta, 17:32101 (R;SU)
Chervyakov, A.M., *See* Barbashov, B.M., 17:32104
Chesnov, A.F., *See* Borisov, O.N., 17:31489
Cheung, N.K.V., *See* Daghighian, F., 17:31902
Chevrel, H., Low temperature sintering of hyperstoichiometric uranium dioxide, 17:30633 (R;FR;In French)
Cheynis, B., *See* Desesquelles, P., 17:32268
Chiang, S.H., *See* Cooper, M.H., 17:30537
Chiappinelli, A., Exotic fermion mixing revisited, 17:32149 (R;FR)
Spontaneous decoupling of extended Gauge models, 17:32148 (R;FR)
Chiba, Satoshi, *See* Fukahori, Tokio, 17:32462
Chiba, Z., *See* Gray, L.W., 17:31322
Chicault, R., *See* Villegier, J.C., 17:31251
Chick, L.A., Alternative materials for solid oxide fuel cells: Factors affecting air-sintering of chromite interconnections, 17:31088 (R;US)
Chilakapati, A., *See* Wheeler, M.F., 17:31728
Chin, Y.H., *See* Furman, M., 17:31465
Ching, S.H., Derived surface contamination limits for the uranium mining and milling industry, 17:30627 (IA;CA)
Review of gamma and radon daughter exposures of uranium mine workers in 1982 and 1983 in terms of the present and proposed amendments to the AEC regulations, 17:31952 (IA;CA)
Chiotellis, E., *See* Cotsyfakis, C., 17:31794
See Papadopoulos, M., 17:31782
See Vavouraki, H., 17:31825
Chiozzone, R., *See* Leon, A., 17:31818
Chipman, N.A., *See* Carleson, T.E., 17:30741
Chivas, A.R., *See* Vangosh, A., 17:31706
See Vengosh, A., 17:31715
Choi, Jaeyoung, ScaLAPACK: A scalable linear algebra library for distributed memory concurrent computers, 17:32514 (R;US)
Cholewa, M., The use of a scanning proton microprobe in AIDS research, 17:31852 (IA;AU)
See Paschoa, A.S., 17:31951
Chomaz, P., *See* Randrup, J., 17:32254
Chomaz, Ph., Comment on the width and the life-time of multiphonon states, 17:32218 (R;FR)
From experimental monopole cross-sections to nuclear incompressibilities, 17:32219 (R;FR)
See Catara, F., 17:32247
Chou, M.I.M, Sulfur removal from high-sulfur Illinois coal by low-temperature perchloroethylene (PCE) extraction: Technical report, December 1, 1991–February 29, 1992, 17:30458 (R;US)
Choudhry, V., *See* Singh, S., 17:30552
Chow, L.S., Molten salt/metal extractions for recovery of transuranic elements, 17:30654 (R;US)
Chow, Poo, *See* Rapp, D.M. Ehrlinger, H.P., 17:30426
Choy, J., *See* Oliva, J.P., 17:31834
Chrien, R.E., The K$^+$ as a probe of nuclear medium effects, 17:32273 (R;US)
Two-nucleon production of hyperons in an $S = -1$ dibaryon search, 17:32274 (R;US)
Christen, R., *See* Chawla, R., 17:30995
Christensen, G.C., *See* Aarkrog, A., 17:31730
Christensen, J.E., *See* Engelund Thomsen, K., 17:31101
Christenson, W.A., *See* McEligot, D.M., 17:31388, 17:31389
Christianson, O., He II and Maglev - Is there a role?, 17:31173 (RA;US)
Christophel, E., *See* Arnold, R., 17:31547
Chruscielewski, W., Radon concentrations in air of Polish underground coal mines, 17:31652 (IA;CA)
See Domanski, T., 17:31651, 17:31950
Chu, D., *See* Kucera, G.H., 17:31078
Chumbalov, A.A., Off-shell effects in the dynamical model of pion photoproduction on nucleon, 17:32326 (R;SU)
Chung, J.N., *See* Martian, P., 17:31698
Cicero, C.A., *See* Andrews, M.K., 17:30743
Cieslak, M., *See* Senger, P., 17:32296

Ciftcioglu, O., Failure detection studies by layered neural network, 17:30959 (R;NL)
  Studies on signal validation and sensor surveillance for in-core signals in NPP: Paper presented at the NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburg, Pennsylvania, USA, 1-4 October 1991, 17:30961 (R;NL)
Cihak, I., *See* Blaha, V., 17:31809
Cihal, V., *See* Bouska, P., 17:31230
Cipriani, C., *See* Shukla, S.K., 17:31786, 17:31810
Claessens, R.A.M.J., Tissue distribution and biokinetics of radiolabeled proteins in rats with a focal infection, 17:31918 (RA;US)
Clapper-Gowdy, M., A quantitative method to detect explosives and other selected semivolatiles in soil samples by Fourier transform infrared spectroscopy, 17:31686 (R;US)
Clark, M.L., *See* Kristofzski, J.G., 17:30757
Clarke, B.G., Repository tunnel construction in deep clay formations, 17:30697 (R;FR)
Clendenin, J.E., Polarized electron sources for linear colliders, 17:31524 (R;US)
Cline, M.C., *See* Yang, S.L., 17:30866
Clogher, L., *See* Whitlow, L.W., 17:32183
Cochran, H.D., *See* Jonah, D.A., 17:31311
Codell, R.B., DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)
  DISPERS: Mathematical models for dispersion of radionuclides, 17:32547 (CM;US)
Coduti, P.L., *See* Gaarenstroom, S.W., 17:31143
Cogburn, R., *See* Shih, H.J., 17:31468
Coggeshall, S.V., Applications of group-invariant analytic solutions to inertial confinement fusion, 17:32464 (R;US)
Cohen, J.D., Microscopic origins of metastable effects in a-Si:H and deep defect characterization in a-Si,Ge:H alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30822 (R;US)
Cole, A.J., *See* Desesquelles, P., 17:32268
Cole, M.J., Pilot process waste assessment for the fireset area, 17:31621 (R;US)
Cole, R., *See* Johnson, K.F., 17:31513
  See Stettler, M., 17:31508
Cole, R.A., Real-time data archiving for GTA, 17:31507 (R;US)
Colin, J., *See* Stuttge, L., 17:32280
Collecchi, P., *See* Mariani, G., 17:31817
Collier, B.D., *See* Ozker, K., 17:31781
Collins, H.D., Ultra wide band 3-D cross section (RCS) holography, 17:31625 (R;US)
Colombo, R., Life cycle cost analysis of solar heating and DHW systems in residential buildings, 17:30820 (R;FR)
Colonna, M., Onset of multifragmentation in medium energy heavy ion collisions, 17:32302 (IA;DE)
Colonna, N., *See* Colonna, M., 17:32302
Comets, M.P., *See* Tatischeff, B., 17:32315
Condit, R.H., *See* Krikorian, O.H., 17:30735
  See Moir, R.W., 17:32471
Conklin, J.C., *See* Hinton, D.L., 17:31386
Conner, C.W., *See* Harold, M.P., 17:31315
Connolly, R., *See* Johnson, K.F., 17:31512, 17:31513
Constantinescu, A., *See* Goomer, N.C., 17:31780
Convert, P., *See* Beaudoing, G., 17:30656
Conway, J.J., *See* Stabin, M.G., 17:31903
Coogan, J.J., *See* Rosocha, L.A., 17:31662
Cook, G.O. Jr., Construction of large-scale simulation codes using ALPAL: Generation of a hydrodynamics code module, 17:32565 (R;US)
Cook, R.C., *See* Kilkenny, J.D., 17:32478
Cook, R.L., *See* Shepard, W.S., 17:31077
Cooke, M.B., *See* Pile, G.D., 17:31472
Cooper, M.B., *See* Mason, G.C., 17:31955
Cooper, M.H., Research and development for storage, transport, and handling of coal-based fuels: Final report, 17:30537 (R;US)
Cope, D., Emerging Maglev research needs, 17:31166 (RA;US)
Cope, M.G., Northwest Montana Libby/Hungry Horse Dams wildlife mitigation Columbian sharp-tailed grouse: Final report, 17:31750 (R;US)
Coppock, E., Occupational radiation exposure and mortality study: Internal linkage of the Canadian National Dose Registry, 17:31922 (R;CA)
Corbett, J.R., *See* Goomer, N.C., 17:31780
Cordfunke, E.H.P., *See* Huntelaar, M.E., 17:30960
  See Kwast, H., 17:32452
Cords, D., Inclusive charged hadron and K^0 production in two-photon interactions, 17:32181 (R;US)
Corkill, D.A., *See* Dory, A.B., 17:30623
  See Morrison, H.I., 17:31937
Corlew, R.P., 200 Areas operation monthly report, September 1967, 17:30635 (R;US)
  200 Areas operation monthly report, October 1967, 17:30636 (R;US)
  200 Areas operation monthly report, October 1968, 17:30637 (R;US)
Corredoura, P., *See* Briggs, D., 17:31497
Corstens, F.H.M., *See* Claessens, R.A.M.J., 17:31918
Cort, B., *See* Lawson, A.C., 17:32041
Cortez, M.M., *See* Sellers, C.H., 17:31228
Corvisiero, P., *See* Anghinolfi, M., 17:31530
Cosmo, F., *See* Stuttge, L., 17:32280
Costello, C.E., *See* Barbarics, E., 17:31824
Costescu, C., GRENADE: 3d multigp diffusion Green's function, 17:32529 (CM;RO)
Cotsyfakis, C., Indium-111 labelled cationic complexes of aminothiols. Structure-activity correlation, 17:31794 (RA;US)
  See Papadopoulos, M., 17:31782
Coulon, R., *See* Jammet, H., 17:30620
Coulter, J.Y., *See* McHenry, M.E., 17:32391
Counce, D.A., *See* Dyer, R.B., 17:31630
Counsell, R.E., *See* DeForge, L.E., 17:31812, 17:31813
  See Plotzke, K.P., 17:31784
  See Schwendner, S.W., 17:31917
Coursey, B.M., National standards for diagnostic and therapeutic nuclides, 17:31884 (RA;US)
  See Desrosiers, M.F., 17:31882
Coursier, J., *See* Bonne, A., 17:30687
Courtois, A., Dione status report, 17:32275 (R;FR)
Coutant, J., *See* Andre, M., 17:32439
Coutts, A., *See* Billinghurst, M.W., 17:31779
Cowan, P.L., *See* Macrander, A.T., 17:31614
Cowart, J.S., The intensity of knock in an internal combustion engine: An experimental and modeling study, 17:31159 (R;US)
Cowen, M.L., A graded approach to safety documentation at processing facilities, 17:30764 (R;US)
Cowley, S.C., *See* Jardin, S.C., 17:32403
Cox, P.H., Technetium labelled somatostatin a potential agent for in vivo tumor localization, 17:31791 (RA;US)
Crane, J., *See* Kasi, L.P., 17:31787
Crawford, R.K., *See* Thiyagaragjan, P., 17:31539
Creamer, S.C., Radioactive waste package assay facility. Volume 3. Data processing, 17:30690 (R;FR)
Crespo, J.L., *See* Lopez, J.V., 17:31026
Cripps, R.C., *See* Furrer, M., 17:32551
Crist, K.C., *See* Scripsick, R.C., 17:31720
Cristalli, M., *See* Shukla, S.K., 17:31786
Cristy, M., Choosing representative body sizes for reference adults and children, 17:31889 (RA;US)
Crocker, N., *See* Hokin, S., 17:32413
  See Prager, S.C., 17:32412
Crosetto, D., Fully pipelined and programmable Level 1 trigger, 17:31527 (R;US)
Crump, O.B. Jr., *See* Sweatt, W.C., 17:31634
Crutcher, J.W., Identifying and building an expert system: The programmer's role, 17:32513 (R;US)
Cruz Inclan, C., Method of characterization of high temperature superconductor ceramics, 17:31252 (I;CU;In Spanish)
Csikai, J, *See* Sandin, C., 17:32343
Cubero, M., *See* Ivanov, Y.B., 17:32304
Cudzinovic, M., *See* Hokin, S., 17:32413
Cui Yonghai, *See* Gao Weisen, 17:30972, 17:31214
Cullen, D., *See* Lee, I.Y., 17:32243
Cummins, W.F., Radio pill antenna range test, 17:31629 (R;US)

Curtis, R.E., Analytical services - Pile area laboratories, 17:30984 (R;US)
Cvelbar, F., *See* Betak, E., 17:32283
Czajkowski, S., *See* Bernas, M., 17:32228

D

D'Aiello, R., *See* Catalano, A., 17:30821
D'Amico, K.L., *See* Milewski, J.O., 17:31406
D'Amico, N., *See* Cooper, M.H., 17:30537
D'Angelo, A., Tagged photon beams obtained by laser Compton scattering on electron beams, 17:32266 (RA;FR)
d'Hose, N., *See* Botton, N. de, 17:32267
D'Souza, P., *See* Bitner, D.M., 17:31820
Da Silva, L.B., *See* Koch, J.A., 17:31426
  See Nilsen, J., 17:31423, 17:31424
Daburon, F., *See* Hoffschir, D., 17:31769
Daemen, J.J.K., *See* Ouyang, S., 17:30710
Daghighian, F., Application of PET and compartmental modeling in estimation of cellular level microdosimetry: PET studies of I-124 labeled 3F8 MAb in human glioma, 17:31902 (RA;US)
Dahlgaard, H., *See* Aarkrog, A., 17:31730
Dai Weizhi, The model and optimization of HTGR nuclear fuel cycle: Pt. 2: Multi-reactor model, 17:30922 (R;CN;In Chinese)
  The model and optimization of HTGR nuclear fuel cycle: Pt. 1: Mono-reactor model, 17:30923 (R;CN;In Chinese)
  See Hu Xien, 17:30639
Dalesio, L.R., *See* Stettler, M., 17:31508
Daly, P.J., A pocketful of tin isomers from heavy-ion collisions, 17:32272 (R;US)
  See Grabowski, Z.W., 17:32240
Dam, M., τ physics at LEP, 17:32180 (R;NO)
  See Bugge, L., 17:31598
Danfors, B., Salix plantation: Machinery, methods and economy, 17:30798 (R;SE;In Swedish)
Daniel, S.L., *See* Payne, A.C. Jr., 17:31023
Danielewicz, P., *See* Barz, H.W., 17:32301
Danielsen, K.M., A narrow centrally produced 3π resonance at 1060 MeV/c^2 observed in pp-reactions at 19 GeV/c, 17:32179 (R;NO)
Danilov, S., Purification of radiolabeled monoclonal antibodies to angiotensin-converting enzyme significantly improves specificity and efficacy of its targeting into the lung, 17:31788 (RA;US)
Danilova, E.A., *See* Diaz Rizo, O., 17:31688
Dannals, R.F., Synthesis of tracers using automated radiochemistry and robotics: Progress report, April 1, 1992–July 31, 1992, 17:31331 (R;US)
Darbaidze, Ya.Z., *See* Sisakyan, A.N., 17:32032
Darivakis, G.S., Coal plasticity at high heating rates and temperatures: First technical progress report for the fourth quarter 1989, 17:30439 (R;US)
Darrow, C.B., *See* Kilkenny, J.D., 17:32478
Darsey, J.A., A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)
Daschil, F., *See* Steinhausler, F., 17:31552
Dasgupta, A.K., *See* Kristofzski, J.G., 17:30757
Dasu, S., *See* Whitlow, L.W., 17:32183
Datskov, V.I., Multichannel recorder of transition processes in superconducting magnets, 17:31488 (R;SU;In Russian)
  See Tsambel, V., 17:31459
Daum, C., *See* Emden, W. van, 17:31519
Dautray, R., *See* Andre, M., 17:32439
Dave, R.N., On development of a three-dimensional particle motion tracking system, 17:30534 (R;US)
  See Rosato, A.D., 17:30523
David, G., *See* Braun-Munzinger, P., 17:32288
Davidson, J., *See* Smith, T., 17:31773
Davidson, N.J., Hadronic gas models and equilibration in heavy ion collisions, 17:32295 (IA;DE)
  Kaon condensation in dense hadronic matter, 17:32227 (IA;DE)
  See Kirchbach, M., 17:32094
Davidson, R.B., Non-US artificial neural network research: FASAC special study, 17:32550 (R;US)
Davier, M., Searches for new particles at LEP, 17:32197 (R;FR)
Davies-White, W., *See* Bulos, F., 17:31522
Davis, G.C., *See* Cowart, J.S., 17:31159
Davison, A., *See* Barbarics, E., 17:31824
Davydova, T.A., Vortices in nonuniform upper-hybrid field, 17:32406 (R;SE)
Davydychev, A.I., A simple formula for reducing Feynman diagrams to scalar integrals, 17:32097 (R;SU)
  General results for massive N-point Feynman diagram with different masses, 17:32096 (R;SU)
Dawson, C.N., *See* Wood, B.D., 17:31727
Dawson, J.M., Application of computer modeling to fusion research: Progress report, November 1, 1991–October 31, 1992, 17:32416 (R;US)
De Blasi, F.S., Topological properties of the solution sets to differential inclusions of evolution type, 17:32083 (R;XA)
Deane, A.M., Volatile organic iodine formation by surface processes, 17:31337 (RA;JP)
deBarbaro, P., *See* Whitlow, L.W., 17:32183
Dec, J.E., Soot and fuel distribution imaging in a diesel engine, 17:31157 (R;US)
deChambrier, G., *See* Whitlow, L.W., 17:32183
Decroisette, M., *See* Andre, M., 17:32439
DeForge, L.E., Comparison of methods for incorporating a radioiodinated residualizing cholesteryl ester analog into low density lipoprotein, 17:31812 (RA;US)
  Synthesis and evaluation of radioiodinated cholesteryl ethers as lipoprotein probes, 17:31813 (RA;US)
DeGalan, M.R., *See* DeForge, L.E., 17:31812
DeHaan, M.S., "You need this done by when?": Increasing your efficiency with the SAS® system, 17:32518 (R;US)
DeHart, M.D., A discrete ordinates approximation to the neutron transport equation applied to generalized geometries, 17:30938 (R;US)
Deibler, J.E., Global-local finite element analysis of composite structures, 17:31277 (R;US)
Del Rio, J., *See* Moser, P., 17:32369
Delageniere, S., Use of a model for 3D image reconstruction, 17:31770 (R;FR;In French)
Delagrange, H., *See* Ostendorf, R., 17:32253
Delaunay, F., *See* Stuttge, L., 17:32280
Delayen, J.R., *See* Sagalovsky, L., 17:31445
Delforge, J., *See* Maziere, B., 17:31797
Dell'Orco, P.C., *See* Dyer, R.B., 17:31630
Della-Negra, S., *See* Benguerba, M., 17:32377
Delmastro, J.R., Spectrophotometric determination of hydrogen peroxide in the presence of fluoride, 17:31309 (R;US)
Delpech, M., Non-isotropic thermal behavior of an MHTGR fuel block: Impact upon reactivity feedback, 17:30901 (R;US)
Delprat-Jannaud, F., Reflexion tomography: what information is comprised in the incoming times, 17:30563 (R;FR;In French)
DeLuca, W.H., Results of advanced batter technology evaluations for electric vehicle applications, 17:31043 (R;US)
Deluchi, M., Motor vehicle fuel economy, the forgotten HC control stragegy?, 17:31187 (R;US)
Demichev, A.P., Anomaly-free gauges in superstring theory and double supersymmetric sigma-model, 17:32098 (R;SU)
Demiral, B.M.R., A three-dimensional laboratory steam injection model allowing in situ saturation measurements, 17:30569 (R;US)
Demirgian, J., *See* Clapper-Gowdy, M., 17:31686
Demmel, J., LAPACK Working Note 9: A test matrix generation suite, 17:32504 (R;US)
Demmer, R., ICPP custom dissolver explosion recovery, 17:30763 (R;US)
Den Hartog, D.J., *See* Hokin, S., 17:32413
  See Prager, S.C., 17:32412
DeNeal, D.L., Reactor operations daily reports, July 1, 1967–June 30, 1968, 17:30980 (R;US)
  Reactor Operations daily reports, July 1, 1968–August 31, 1968: Rough draft, 17:30981 (R;US)
Deng Xiaohua, *See* Zhang Cheng, 17:32398
Deniau, H., Development of time-resolved laser fluorescence spectrometry for on-line uranium checking in solutions of the Purex reprocessing process, 17:30640 (R;FR;In French)
Denisenko, K.G., *See* Vodop'yanov, A.S., 17:31573

Denisenko, N.L., *See* Vodop'yanov, A.S., 17:31573

Depauw, J., *See* Benguerba, M., 17:32377

Desdin, L., *See* Sandin, C., 17:32343

Desesquelles, P., Measurement and analysis of charge partitions in nuclear disassembly, 17:32268 (R;FR)

Desrosiers, A.E., *See* Poston, R.W., 17:32544

Desrosiers, M.F., A new approach to radiopharmaceutical dose assessment, 17:31882 (RA;US)

Dessagne, P., *See* Bernas, M., 17:32228

Deutsch, L., The impact of right-of-way geometry on ride quality, 17:31180 (RA;US)

DeVan, J.H., Oxidation-sulfidation behavior of iron alloys containing 16 to 40 atomic percent aluminum, 17:31216 (R;US)

See Tortorelli, P.F., 17:31219

DeVault, R.C., Triple-effect absorption chiller cycles, 17:31096 (R;US)

Deveney, M.F., Temperature tracking SPICE macro-model for laser and LED driven opto-coupler assemblies, 17:31417 (R;US)

Devgun, J.S., *See* Beskid, N.J., 17:31061

deVillier, A.J., *See* Morrison, H.I., 17:31937

Devine, R.T., *See* Zeman, G.H., 17:31588

Dewanjee, M.K., Comparative loss of In-111 labeled PMN granulocyte from dog, pig and man to cellulose acetate hemodialyzer (HD), 17:31842 (RA;US)

Comparative PMN granulocyte retention of In-111 and Tc-99m HMPAO labeled PMN granulocyte of dogs on cellulose acetate hemodialyzers (HD), 17:31841 (RA;US)

Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on platelet kinetics in Beagle dogs: Comparison with In-111 labeled platelets, 17:31913 (RA;US)

Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on ligand exchange and binding with hemoglobin: Comparison with In-111 tropolone, 17:31921 (RA;US)

Mapping histone4 mRNA in pig brain with In-111 labeled anti-sense oligo-nucleotide by in-situ hybridization, 17:31801 (RA;US)

Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model, 17:31821 (RA;US)

Quantitation of comparative thrombogenicity of dog, pig and human platelets (PLT) in a hemodialyzer (HD), 17:31840 (RA;US)

Quantitation of thrombogenicity of technetium-99M and indium-111 labeled canine platelets (PLT) in a hemodialyzer (HD), 17:31839 (RA;US)

Dewey, H., Processing flowsheet for the accelerator transmutation of waste (ATW) program, 17:30707 (R;US)

Dewey, R.J., *See* Leonard, P.J.T., 17:32053

Dexter, R., *See* Hokin, S., 17:32413

Dexter, R.N., *See* Prager, S.C., 17:32412

Dezi, R., *See* Canellas, C.O., 17:31843

Dharmapurikar, R., *See* Sheth, A.C., 17:30864

Dhodapkar, S.V., *See* Cooper, M.H., 17:30537

Di Cioccio, L., *See* Villegier, J.C., 17:31251

Di Luca, L., *See* Mariani, G., 17:31817

Di Stefano, R., *See* Mariani, G., 17:31817

Di Toro, M., *See* Colonna, M., 17:32302

Di, Y., *See* Halpern, B.L., 17:31081

Diao Wentang, Expansive-graphite-sandwiched spiral-wound stainless steel gasket applied to manhole sealing joints of nuclear equipment, 17:31267 (R;CN;In Chinese)

Diaz Rizo, O., Basic analysis of sugar cane lead and cane fields of an AIC, 17:31688 (I;CU;In Spanish)

Diaz, A.A., *See* Doctor, S.R., 17:31022

Dickinson, D.R., *See* Ritzman, R.L., 17:31015

Didelez, J.P., Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons, 17:32259 (R;FR)

Total cross sections for the PPπ deg channel in the inelastic PP interaction, 17:32317 (R;FR)

Didyk, A.Yu., *See* Goleminov, N.G., 17:31604

Diediker, L.P., *See* Kristofzski, J.G., 17:30757

Diego, N. de, *See* Moser, P., 17:32369

Diemer, H., *See* Leide, S., 17:31906

Diercks, D.R., *See* Park, J.Y., 17:30653

Dieren, E.B. van, The application of the distance histogram in microdosimetry for evaluating heterogeneity, 17:31909 (RA;US)

Dietrich, W.D., *See* Dewanjee, M.K., 17:31801

Difilippo, A.A., *See* Chaiko, D.J., 17:31310

Difilippo, F.C., *See* Perez, R.B., 17:32277

DiIorio, G., *See* Porges, K.G., 17:32437

Dillstroem, P., *See* Bergman, M., 17:30949

Ding Wu, *See* Yang Zhenhua, 17:31483

Ding Yaping, *See* Tian Baiyuan, 17:31212

Dingman, S., *See* Rasmuson, D.M., 17:31019

Dingman, S.E., *See* Payne, A.C. Jr., 17:31023

DiResta, G.R., *See* Daghighian, F., 17:31902

Dittrich, T., *See* Kilkenny, J.D., 17:32478

Diver, R.B., Mirror alignment techniques for point-focus solar concentrators, 17:30830 (R;US)

Dixit, S.N., Numerical modelling of the suppression of stimulated Brillouin scattering due to finite laser bandwidth, 17:31420 (R;US)

Dixon, D.W., A comparison of methods for monitoring miner exposure to radon decay products, 17:31953 (IA;CA)

A review of all sources of exposure to natural radiation in UK mines, 17:31719 (IA;CA)

Dixon, W., *See* Saccomanno, G., 17:31942

Djalali, C., *See* Morjean, M., 17:32314

Djemai, A.E.F., Non-commutative differential geometry: 1. Geometrical symplectic formulation of classical mechanics, 17:32023 (R;XA)

Dmitrievskij, V.P., *See* Borisov, O.N., 17:31489

Dobranich, D., A computer program for engineering simulations of space reactor system performance, 17:30916 (R;US)

Dobson, D., *See* Coppock, E., 17:31922

Dockery, H.A., *See* Barnard, R.W., 17:30719

Doctor, S.R., Nondestructive examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Semiannual report, October 1990–March 1991: Volume 13, 17:30921 (R;US)

Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991, 17:31022 (R;US)

Dodds, H.L., *See* Waddell, M.W. Jr., 17:32353

Doerfler, D.W., Software overview for the Annunciator Communication System: Interim report: Revision, 17:31626 (R;US)

Dolan, T.J., A vacuum disengager for tritium removal from HYLIFE-II Reactor Flibe, 17:32457 (R;US)

See Moir, R.W., 17:32471

Dolveck, J.Y., Probing atomic-size defects and free volumes with positron and positronium, 17:32370 (R;FR)

Dolz, G., *See* Moreno, E., 17:31863

Domanski, T., Long term measurements of WL-levels in metal mines by using the ASS-system and HCS-system, 17:31651 (IA;CA)

Pb-210 concentrations in the blood of ground workers and underground miners of zinc-lead mine, 17:31950 (IA;CA)

See Chruscielewski, W., 17:31652

Donald, M., *See* Bulos, F., 17:31522

Donaldson, A.R., SLAC modulator operation and reliability in the SLC Era, 17:31526 (R;US)

Dongarra, J.J., *See* Choi, Jaeyoung, 17:32514

Dongen, R. van, Measurement of the radiation-level at the site of the Dutch National Institute for Public Health and Environmental Hygiene (RIVM) during the year 1990, 17:31731 (R;NL;In Dutch)

Doniec, J., *See* Domanski, T., 17:31950

Doppelt, S., *See* Castronovo, F.P. Jr., 17:31795

Doran, L., *See* Parrott, L., 17:31062

Dorfan, J.M., *See* Cords, D., 17:32181

Dorr, B., *See* Bottoni, M., 17:31395

Dory, A.B., Practical approach to retrospective estimation of radon daughter concentration in the underground mining environment, 17:30623 (IA;CA)

See Morrison, H.I., 17:31937

Dos Santos, A.M., Study of a MSW incinerator: Overall operation and on-site measurements in the fire box, 17:30809 (R;SE)

Dosser, L.R., Spectroscopic studies of the 110°C thermal aging of PETN, 17:31274 (R;US)

Doty, F.D., Microtube strip heat exchanger: Final technical report, 17:31125 (R;US)

Doty, M.W., Guide to computer protection at ANL: Revision 1, 17:32505 (R;US)

Dou Yikang, *See* Qu Jiadi, 17:30880

Douglas, D.G., Leak testing plan for the Oak Ridge National Laboratory liquid low- level waste system (active tanks): Volume 1, Regulatory background and plan approach; Volume 2, Methods, protocols, and schedules; Volume 3, Evaluation of the ORNL/LT-823DP differential pressure leak detection method: Environmental Restoration Program, 17:30645 (R;US)
Dowdy, L.W., *See* Carlson, B.M., 17:32512, 17:32558
Doyle, B.L., *See* Nygren, R.E., 17:32470
Drain, D., *See* Desesquelles, P., 17:32268
Drake, J.B., *See* Lynch, V.E., 17:32405
Draper, B.L., *See* Milner, L.M., 17:31419
Drashil, V., *See* Koudela, K., 17:31963
Drawin, H.W., *See* Dubois, M.A., 17:32458
Drayton, R., *See* Vaughan, N., 17:30826
Dresner, L., *See* Lubell, M.S., 17:31171
Drossinos, Y., *See* Benson, C.G., 17:30871
Druzhina, N.A., *See* Antonenko, S.G., 17:31984, 17:31985
Du Shuhua, *See* Du Xiangwan, 17:31191
Du Xiangwan, Space nonweaponization. An urgent task for arms control, 17:31191 (R;CN;In Chinese)
Duan Dezhi, *See* Tang Yiru, 17:30634
Duan Shuyun, Observation of spatial resolution of ECR plasma on the MM-2 magnetic mirror, 17:32401 (R;CN;In Chinese)
Dubbeldam, R., *See* Emden, W. van, 17:31519
Dubinin, A.A., REMP1-PC computer code for optimization of radiation shields characteristics, 17:32344 (R;SU;In Russian)
Dubnicka, S., *See* Dubnickova, A.Z., 17:32195
Dubnickova, A.Z., Some new aspects of the unitary and analytic VMD model for electromagnetic structure of hadrons, 17:32195 (R;SU)
Dubois, M.A., Determination of the safety factor profile in Tore Supra from striations observed during pellet ablation, 17:32458 (R;FR)
  The Beasts' model of percolative transport, 17:32424 (R;FR)
  See Hennequin, P., 17:32425
Duborgel, B., *See* Andre, M., 17:32439
Duchane, D., *See* Brown, D., 17:30837
Duchane, D.V., Industrial applications of hot dry rock geothermal energy, 17:30844 (R;US)
  Prospects for the commercial development of hot dry rock geothermal energy in New Mexico, 17:30838 (R;US)
Duda, J.R., *See* Zammerilli, A.M., 17:30590
Duda, P.M., *See* Nelson, L.S., 17:31029
Dudczak, R., *See* Leitha, T., 17:31802, 17:31814
Dudek, J., Nuclear superdeformation at high spins, 17:32215 (R;FR)
  See Werner, T.R., 17:32214
Duding, B., *See* Beaudoing, G., 17:30655, 17:30656
Dudley, A.L., *See* Gauthier, J.H., 17:30717
Duggal, B.P., A remark on the unitary part of contractions, 17:32075 (R;XA)
  Nth roots of normal contractions, 17:32082 (R;XA)
Duguid, J.O., *See* Pahwa, S.B., 17:30722
Duijves, K.A., Progress report of the ECN contribution to the experiments in the HAW project: 1st half year 1991, 17:30681 (R;NL)
Dukelow, G.T., *See* Cash, R.J., 17:30739
Duniec, S., *See* Chen, Q., 17:30898
Dunlop, A., Electronic excitations in metallic systems: from defect annihilation to track formation, 17:32375 (R;FR)
Dunn, F., Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code, 17:30910 (R;US)
Dunn, T.D., Impact of increasing MHTGR power on passive heat removal, 17:30903 (R;US)
Dunsmuir, J.H., *See* Milewski, J.O., 17:31406
Dunyak, T.J., *See* Stinchcomb, W.W., 17:31260
Duport, P.J., Characterization of radioactive long-lived dust present in uranium mines and mills atmospheres, 17:30624 (IA;CA)
Duret, D., Oxygen concentration measurements using the ESR line modification of PcLi molecules, 17:31289 (R;FR)
Durham, J.S., *See* Reece, W.D., 17:32542
Duschner, H., *See* Psarros, N., 17:30641
Duthie, R.G., *See* Knight, R.A., 17:31296
Dutton, L.M.C., The modelling of iodine behavior for assessing the radiological consequences of a design basis accident, 17:30895 (RA;JP)
Duval, M.A., *See* Didelez, J.P., 17:32317
Dvoeglazov, V.V., H^+H^- interaction up to higher orders of perturbation theory in the model with two Higgs doublets (Lagrangian and one-loop amplitudes), 17:32142 (R;SU)
  H^+H^- interaction up to higher orders of perturbation theory in the model with two Higgs doublets (self-energy and vertex diagrams), 17:32194 (R;SU)
Dyer, R.B., Destruction of explosives and rocket fuels by supercritical water oxidation, 17:31630 (R;US)
Dykhuizen, R.C., Steady-state cooling of a high-temperature superconducting motor, 17:32392 (R;US)

E

Eash, D.T., *See* Lawson, A.C., 17:32041
Eaton, L.E., *See* Young, A., 17:31514
Eaton, R.R., *See* Barnard, R.W., 17:30719
Ebbinghaus, B.B., *See* Krikorian, O.H., 17:30735
Ebert, D., Hadronization of QCD, 17:32143 (R;SU)
Eckerman, K.F., Health and dosimetry considerations in the ICRP 1990 formulation of effective dose, 17:31879 (RA;US)
  See Faw, R.E., 17:31908
  See Stubbs, J.B., 17:31901
Ecklund, S.D., *See* Clendenin, J.E., 17:31524
Eden, J., *See* Furman, M., 17:31465
Eder, D.C., Table-top x-ray lasing based on optical-field-induced ionization, 17:31425 (R;US)
Edick, J.D., *See* Dykhuizen, R.C., 17:32392
Edler, L., *See* Andersson, Lars, 17:31756
Edmunds, T.A., An integrated methodology for sabotage vulnerability assessment, 17:30777 (R;US)
Edneral, D.I., *See* Belyaev, I.Ya., 17:31957
Edward, J.B., *See* Fluke, R.J., 17:31341
Edwards, B.C., *See* Bloch, J.J., 17:32054
Edwards, D.D., *See* Bartholomay, R.C., 17:31752
Edwards, D.J., The response of dispersion-strengthened copper alloys to high fluence neutron irradiation at 415°C, 17:32467 (R;US)
Edwards, G., *See* Morlet, M., 17:32314
Edwardson, E., *See* Duport, P.J., 17:30624
Egebaeck, K.E., *See* Westerholm, R., 17:30582
Egelstaff, P.A., Miniature neutron sources: Thermal neutron sources and their users in the academic field, 17:30781 (R;US)
Egelund Thomsen, K., Measurement and calculations of the solar radiation through glass areas, taking into consideration the objects shadowing the low energy house G in Hjortekaer, 17:31099 (R;DK;In Danish)
  Optimal design of windows: An investigation of heat technology, 17:31102 (R;DK;In Danish, English)
Egnell, R., The diesel engine and its potential for improvement, 17:31156 (R;SE;In Swedish)
Egorov, A.I., *See* Borovikova, N.V., 17:32351
Egorov, V.G., Investigation of β-ν angular correlation in decay of ^{24}Na nuclei, 17:32249 (R;SU)
Ehler, G., *See* Pokotilovskij, Yu.N., 17:32346
Eide, S.A., *See* Bolander, T.W., 17:32007
Eiholzer, C.R., *See* Garner, F.A., 17:31237
Eijkeren, M. van, *See* Poupeye, E., 17:31819
Eikelboom, J.A., Ac losses test on Nb_3Sn strands, 17:32388 (R;NL)
Eikenberg, J., *See* Frick, U., 17:31729
Eimerl, D., *See* Webb, M.S., 17:32477
Ekeborg, T., Natural gas and biogas vehicles: Projects and activities during 1991, 17:31190 (R;SE;In Swedish)
Ekelund, T., Linear quadratic control of variable speed wind turbines below rated power, 17:30859 (R;SE)
Ekmann, J.M., *See* Wildman, D.J., 17:30521
El-Assaly, F.M., *See* Hussein, H.A., 17:30612
El-Genk, M.S., *See* Harper, F.T., 17:31401
El-Naggar, A.M., *See* Hussein, H.A., 17:30612
Elayi, A., *See* Hourani, E., 17:32248
Elert, M., Scenarios for groundwater flow and radionuclide migration of concern for the TVO-92 safety analysis, 17:30749 (R;FI)

Ellehauge, K., Solar heating system for the combined space heating of and domestic hot water: Development of a competitive system. Calculations and measurements in relation to the test plant, 17:30825 (R;DK;In Danish)
Ellender, M., *See* Naylor, G.P.L., 17:31881
Elliott, S.R., *See* Nilsen, J., 17:31423
Ellis, R.J., *See* Kilkenny, J.D., 17:32478
Ellison, J.A., *See* Shih, H.J., 17:31468
Elson, R., *See* Dewanjee, M.K., 17:31839, 17:31841
Eltom, A.H., *See* Sadanandan, N.D., 17:31144
Emanuele, N.V., *See* Ho, C., 17:32003
Emden, W. van, Mechanical behaviour of a closed collar model for an 11.5 T dipole magnet, 17:31519 (R;NL)
Emery, V.J., Frustrated phase separation and high temperature superconductivity, 17:31248 (R;US)
Emran, A.M., Radioarsenic labeled compounds: Synthesis and biological evaluation for potential application in nuclear imaging and therapy, 17:31772 (RA;US)
Endo, M., *See* Karasawa, H., 17:31326
Engeland, T., *See* Hjort-Jensen, M., 17:32239
Engelund Thomsen, K., Analysis of heat accumulation capacities in relation to residential buildings: Literature study, 17:31101 (R;DK;In Danish)
The influence of heat bridges on heat losses in buildings, 17:31104 (R;DK;In Danish)
See Petersen, E., 17:31106
England, A.C., *See* Uckan, T., 17:32433
England, T.R., Recent advances in the US fission yield and delayed neutron evaluations, 17:32339 (R;US)
See Wilson, W.B., 17:32340
English, C.A., *See* King, S.L., 17:31200
Enick, R.M., *See* Sabeh, M., 17:30572
Enomoto, Atsushi, *See* Kamitani, Takuya, 17:31538
Epperson, J.E., *See* Thiyagarajan, P., 17:31539
Epstein, R.I., Neutron superfluid dynamics, 17:32057 (R;US)
Ercan, M.T., *See* Reidel, G., 17:31829
Erickson, C.L., *See* Sykes, T.R., 17:31811
Erickson, M.D., *See* Beskid, N.J., 17:31061
Erickson, W.C., *See* Korzekwa, D.R., 17:31236
Ericson, M.N., *See* Wintenberg, A.L., 17:31354
Ericsson, L., *See* Ahlbom, K., 17:30748
Eriksson, H., Biomass fuels - effects on the carbon dioxide budget, 17:30813 (R;SE)
Eriksson, U., A simple method for separating fines from fuel chips, 17:30805 (R;SE;In Swedish)
Erkloe, E., *See* Sulku, J., 17:31114
Ermak, D.L., Dense-gas dispersion advection-diffusion model, 17:31675 (R;US)
Eronen, M., On the world's ice ages and changing environments, 17:30747 (R;FI)
Ertel, M., *See* Andresen, H., 17:32261
Escalier des Orres, P., An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)
Eshima, D., *See* Bitner, D.M., 17:31820
See Stabin, M.G., 17:31903
Espey, C., *See* Dec, J.E., 17:31157
Esponda, A., *See* Verdera, S., 17:31823
Essabaa, S., *See* Arianer, J., 17:31485
Essler, W., *See* Dutton, L.M.C., 17:30895
Essling, A.M., Innovative methods for inorganic sample preparation, 17:31286 (R;US)
Estrada, J.S., *See* Carvalho, S.M., 17:30610
Estrade, J., *See* Thevenot, G., 17:32441
Evans, G.J., ACE bench-scale studies of iodine volatility and interaction with epoxy painted surfaces, 17:31338 (RA;JP)
See Fluke, R.J., 17:31341
See Kupferschmidt, W.C.H., 17:30944, 17:31339, 17:31340
Evans, J.C. Jr., *See* Anheier, N.C. Jr., 17:31307
Even, O., *See* Assael, Y., 17:31700
Ewing, R.I., Application of a safeguards radiation measurement system to the screening of spent fuel assemblies for transport and storage, 17:30646 (R;US)
Eyl, D., *See* Andresen, H., 17:32261

F

Fabre de la Ripelle, M., Green function and scattering amplitudes in many dimensional space, 17:32029 (R;FR)
Potential harmonic calculations of the binding energies of bosons and fermions in nuclear physics, 17:32193 (R;FR)
Potential harmonic expansion for atomic wave functions, 17:32354 (R;FR)
See Adam, R.M., 17:32231
Faessler, A., *See* Huang, S.W., 17:32303
See Khoa, D.T., 17:32294
See Lehmann, E., 17:32305
See Puri, R.K., 17:32307
Fahlen, P., Heat measurements in fluid systems, 17:31094 (R;SE;In Swedish)
Fahlman, G.G., *See* Leonard, P.J.T., 17:32056
Fahrenholtz, J.C., Automated weapon disassembly, 17:31364 (R;US)
Fair, M., *See* Coppock, E., 17:31922
Fairfield, K., *See* Bulos, F., 17:31522
Fang Jidong, *See* Gao Weixiang, 17:30783
Far, B.H., A research on applications of qualitative reasoning techniques in Human Acts Simulation Program, 17:31359 (R;JP)
Faraggi, A.E., Superstring derived standard-like models and the top quark mass hierarchy, 17:32128 (R;US)
Fargue, D., *See* Jamet, P., 17:30729
Faris, G.W., Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991, 17:32479 (R;US)
Farmer, F.G., Risk assessment handbook, 17:30759 (R;US)
Farmer, J.C., *See* Gray, L.W., 17:31322
Farooque, M., *See* Yuh, C.Y., 17:31084
Faure, J., *See* Courtois, A., 17:32275
Faust, H., *See* Bernas, M., 17:32228
Fava, L., *See* Arvieux, J., 17:32154
Faw, R.E., Point-pair distributions for internal dosimetry, 17:31897 (RA;US)
X-ray and radioiodine dose to thyroid follicular cells, 17:31908 (RA;US)
Fawwaz, R.A., *See* Wang, T.S.T., 17:31793
Fazio, F., *See* Paganelli, G., 17:31816
Federspiel, F.J., The proton Compton effect: Recent measurements of the electric and magnetic polarizabilities of the proton, 17:32201 (R;US)
Fedorenko, B.S., Comparative aspects of carcinogenic effects caused by protons, helium ions and γ-radiation, 17:31981 (RA;SU;In Russian)
Fedorov, V.V., *See* Alekseev, V.L., 17:32380
Feinendegen, L.E., Risk assessment from heterogeneous energy deposition in tissue, the problem of effects from low doses of ionizing radiation, 17:31878 (RA;US)
Feldman, G.J., *See* Cords, D., 17:32181
Feldman, R.B., *See* Wilke, M.D., 17:31511
Feldmeier, H., Gross properties of nuclei and nuclear excitations. Proceedings, 17:32285 (I;DE)
Felton, W., *See* Pahwa, S.B., 17:30722
Feng Mingquan, Irradiation test of borosilicate glass burnable poison, 17:30889 (R;CN;In Chinese)
Feng Shangshen, *See* Cao Xiaowen, 17:32384
Feng, Y., *See* Miller, L.F., 17:31993
Fergerson, R.W., *See* Morlet, M., 17:32314
Ferguson, S.R., *See* Milewski, J.O., 17:31406
Fernandez, R.A., *See* Lopez, J.V., 17:31026
Fernandez, S., *See* Buron, J.M., 17:31342
Ferrante, V., The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria, 17:31210 (R;FR;In French)
Ferre, M., *See* Wuosmaa, A.H., 17:32212
Ferrer, *See* Stuttge, L., 17:32280
Ferrere, D., *See* Schneegans, M., 17:31584
Ferrero, J.L., *See* Mau, N.V., 17:32318

Ferrero, L., *See* Arvieux, J., 17:32154
Ferro, G.F., Synthesis, pharmacokinetic and clinical studies of ^{131}I-MIBG prepared in Mexico, 17:31837 (RA;US)
Fiedeldey, H., *See* Adam, R.M., 17:32231
Fieguth, T., *See* Bulos, F., 17:31522
Fierz, T., *See* Frick, U., 17:31729
Fiesselmann, B., *See* Catalano, A., 17:30821
Fifield, L.K., *See* Orr, N.A., 17:32234
Fiksel, G., *See* Hokin, S., 17:32413
See Prager, S.C., 17:32412
Filippov, A.T., Quantum discrete gauge models with bosonic and fermionic degrees of freedom, 17:32108 (R;SU)
Finch, S.M., Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992, 17:32000 (R;US)
Finck, P.J., *See* Delpech, M., 17:30901
Findlay, D.J.S., Radioactive waste package assay facility. Volume 1. Application of assay technology, 17:30688 (R;FR)
See Bailey, M., 17:30689
Finley, S.J., Small-scale brine inflow experiments: Data report through June 6, 1991, 17:30718 (R;US)
Finn, R.D., *See* Daghighian, F., 17:31902
Finnstroem, B., Program of research and development on the production of hydrogen from water: Annual progress report 1990, 17:30795 (R;SE)
Fireman, S., *See* Thatcher, M., 17:31927
Fischer, I.S., *See* Rosato, A.D., 17:30523
Fisher, A.S., Scaling of gain with energy spread and energy in the PEP FEL, 17:31529 (R;US)
Fisk, Z., *See* Hayden, S.M., 17:32387
Fite, C., *See* Stettler, M., 17:31508
Fix, J.J., Consistency of external dosimetry in epidemiologic studies of nuclear workers, 17:31987 (RA;US)
See Lyon, M., 17:31994
Flament, T., *See* Thevenot, G., 17:32441
Flanagan, R.D., *See* Bennett, R.M., 17:31284
Fleishman, M.J., *See* Wang, T.S.T., 17:31793
Fleming, D.L., *See* Krikorian, O.H., 17:30735
Fleming, R.M., *See* Hay, R.V., 17:31892
Fletcher, J.G., Distributed make (and more), 17:32566 (R;US)
Floyd, H.L., *See* Parrott, L., 17:31062
Fluke, R.J., Advanced Containment Experiments (ACE): Evaluation of pre-test code calculations of iodine behaviour in the Radioiodine Test Facility, 17:31341 (RA;JP)
The Canadian programme on iodine chemistry in reactor safety, 17:31014 (RA;JP)
Follin, S., Numerical calculations on heterogeneity of groundwater flow, 17:31759 (R;SE)
Foltyn, E., *See* Lawson, A.C., 17:32041
Fonck, R., *See* Hokin, S., 17:32413
Fonck, R.J., *See* Prager, S.C., 17:32412
Fontes, A.F., *See* Krikorian, O.H., 17:30735
Fonteyne, A., *See* Bonne, A., 17:30687
Ford, B.L., *See* Kupferschmidt, W.C.H., 17:30944
Ford, M.K., Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program FY 1993–2002, 17:31027 (R;US)
Fornal, B., *See* Daly, P.J., 17:32272
See Grabowski, Z.W., 17:32240
Forrest, K.R., *See* Findlay, D.J.S., 17:30688
Forrest, R.A., *See* Kopecky, J., 17:32216
Forsyth, E., Intermetallic superconductors - The state of development in 1991, 17:32382 (RA;US)
Fortes, A.F., Wake architectures in two-dimensional fluidization of spheres: Experiments and phenomenological description, 17:30540 (RA;US)
Fossella, F., *See* Kasi, L.P., 17:31787
Foster, G., *See* Markley, F., 17:31603
Foti, D.J., *See* Geiger, G.T., 17:31033, 17:31034
Fourcade, N., A dynamic approach to the implementation of the optimization principle in uranium mines, 17:30611 (IA;CA)
Fournier, D., *See* Bottlaender, M., 17:31798
Fowler, C.M., *See* Freeman, B.L., 17:31636
Fowler, S., *See* Cheng, K.T., 17:31836
Fox, E.T., *See* Doerfler, D.W., 17:31626
Fox, J.D., *See* Briggs, D., 17:31497
Fox, M.R., Communicating science and energy in public-lessons from the real world, 17:31063 (R;US)
Foy, B.R., *See* Dyer, R.B., 17:31630
Francis, C.W., *See* Gates, D.D., 17:30754
Franenberg, H.W., *See* Leroy, P., 17:30657
Frangulian, G.S., *See* Adamian, F.V., 17:32310
Frank, D., Neural network sensor fusion for security applications, 17:31628 (R;US)
Frank, M.E., *See* Brown, D.M., 17:30452
Franke, W.G., *See* Schomaecker, K., 17:31783
Franklin, J.C., *See* Briggs, M.R., 17:31555
See Sheeran, C.T., 17:30631
Franssen, F., *See* Baumann, M.J., 17:30648
Frappat, L., A quasi-parafermionic realization of G_2 and $U_q(G_2)$, 17:32040 (R;FR)
General construction of the Virasoro algebra from superalgebras, 17:32116 (R;FR)
Frascaria, N., Giant resonances and multiphonons states in heavy ion reactions, 17:32316 (R;FR)
Frascaria, R., *See* Didelez, J.P., 17:32317
Fredrickson, D.R., *See* Chaiko, D.J., 17:31310
Fredrickson, E.D., *See* Nagayama, Y., 17:32434
Freedman, R., *See* Grant, K., 17:31676
Freeman, B.L., Advanced high-explosive flux compression generator development: The CN-III series, 17:31636 (R;US)
Freer, M., *See* Wuosmaa, A.H., 17:31540
Freitas Rachid, L.B. de, Natural gas participation on brazilian demand supply of liquefied petroleum gas, 17:30597 (IA;BR;In Portuguese)
Frescura, G.M., *See* Fluke, R.J., 17:31014
Freudenreich, W.E., Development study of a biological thermal neutron facility for the Petten BNCT project at the LFR, 17:31848 (R;NL)
Heat production by photons in the BNCT beam filter components in HB11 at the HFR, 17:31847 (R;NL)
See Voorbraak, W.P., 17:31550
Frey, A., *See* Andresen, H., 17:32261
Frick, U., The radionuclide migration experiment - overview of investigations 1985 - 1990: Grimsel test site, 17:31729 (R;CH)
Friedrich, R., Two-loop corrections for nuclear matter in the Walecka model with form factors, 17:32223 (IA;DE)
Friend, L.L., *See* Koziar, G., 17:30589
Friend, M.L., *See* Koziar, G., 17:30589
Friley, J.R., *See* Doctor, S.R., 17:31022
Friman, B.L., *See* Herrmann, M., 17:32224
Fritz, B., *See* Hnatowich, D.J., 17:31830
See Rusckowski, M., 17:31838
Fritz-Niggli, H., Simulation and depression of repair in mutagenesis of Drosophila: adaptive response and heavy ion effect, 17:31975 (RA;SU)
Froehle, P.H., *See* Klickman, A.E., 17:32537
Froelich, T.J., *See* Lyon, M., 17:31994
Fromont, B., *See* Dubois, M.A., 17:32424
Front, K., *See* Pitkaenen, P., 17:30752
Frost, J.K., *See* Chou, M.I.M, 17:30458
Fry, H.A., *See* Greiner, N.R., 17:31631
Frymier, J.W., Preliminary investigation of water coagulation characteristics as affects reactor effluent radionuclides, 17:30967 (R;US)
Frysinger, G.S., *See* Korenowski, G.M., 17:32015
Fu Guogan, *See* Zhang Yingchao, 17:32506
Fu Zhujun, α-sealed transfer device and portable plastic film sealers, 17:31349 (R;CN;In Chinese)
Fu, C.Y., International evaluation cooperation task 1.1 : intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32284 (R;NL)
Fuchs, H., *See* Jouan, D., 17:32313
Fuchs, Juergen, Operator algebra from fusion rules II: Implementing apparent singularities, 17:32124 (R;NL)
Fuciarelli, A.G., *See* Zimbrick, J.D., 17:31996
Fugate, D., Design of advanced stray field shielding for Maglev, 17:31164 (RA;US)

Fujishiro, Toshio, *See* Homma, Kozo, 17:30953
Fujita, Hideo, *See* Tsuneoka, Masaki, 17:32461
Fukahori, Tokio, Comparison of double-differential neutron emission cross sections calculated from evaluated nuclear data libraries with experimental data, 17:32462 (R;US)
  Proceedings of the specialists' meeting on high energy nuclear data, 17:32211 (R;US)
Fukuda, Kousaku, *See* Kobayashi, Fumiaki, 17:30991
Fukushima, E., *See* Altobelli, S.A., 17:30519
Fumelli, M., *See* Pamela, J., 17:32444
Funcke, J., *See* Hellmann, S., 17:30945
Funk, D.J., *See* Palmer, B.A., 17:31079
Funk, K.A., *See* Dyer, R.B., 17:31630
Furget, C., *See* Bocquet, J.P., 17:32312
Furlan, P., Coherent state operators and n-point invariants for $U_q(sl(2))$, 17:32026 (R;FR)
Furman, M., Beam-beam diagnostics from closed-orbit distortion, 17:31465 (R;US)
Furnish, M.D., Recent advances in methods for measuring the dynamic response of geological materials to 100 GPa, 17:32016 (R;US)
Furrer, M., Validation of IMPAIR 2 code using ACE-test results from the Radioiodine Test Facility (RTF), 17:32551 (RA;JP)

G

Gaarenstroom, S.W., Interfacial microchemical characterization needs in surface processing, 17:31143 (R;US)
Gabor, J.D., Molten aluminum alloy fuel fragmentation experiments, 17:30997 (R;US)
Gago, J., *See* Sellin, P., 17:30723
Gagrskij, Yu.P., *See* Blashchak, Z., 17:31579
Gahm, G.F., *See* Carlqvist, P., 17:32063
Gal'perin, A.G., *See* Avramenko, S.A., 17:32332
Gale, J., Characterization of the structure and geometry of the H fracture zone at the SCV site, 17:31745 (R;SE)
  See Herbert, A., 17:31743
Gales, S., AGOR: A superconducting cyclotron for light and heavy ions plans for experimental facilities and physics program, 17:31433 (R;FR)
Galtieri, A.B., *See* Barnett, R.M., 17:32152
Galumian, P.I., *See* Adamian, F.V., 17:32310
Gan, T.H., *See* O'Brien, R.S., 17:30614
Gangopadhyay, D., *See* Filippov, A.T., 17:32108
Gano, L., *See* Neves, M., 17:31826
Ganor, J., Involvement of fluids in regional metamorphism: A preliminary study of carbonate isotope compositional profiles on Sifnos (Cyclydes, Greece), 17:31711 (IA;IL)
Gansow, O.A., *See* Hay, R.V., 17:31892
Ganz, W., *See* Dewanjee, M.K., 17:31821
Ganz, W.I., *See* Dewanjee, M.K., 17:31839, 17:31840, 17:31841, 17:31842, 17:31913, 17:31921
Gao Jijin, *See* Chen Bingxian, 17:31602
Gao Lixia, *See* Li Caiyun, 17:32383
  See Liu Jianmin, 17:32386
Gao Wanshan, *See* Gao Weixiang, 17:30783
Gao Weisen, Irradiation surveillant test of High Flux Engineering Test Reactor (HFETR) pressure vessel, 17:30972 (R;CN;In Chinese)
  Neutron irradiation test of the S271 steel, 17:31214 (R;CN;In Chinese)
Gao Weixiang, Model SM-1 ballast density gauge, 17:30783 (R;CN;In Chinese)
Gao Xiaohui, *See* Cao Xiaowen, 17:32384
Gao Xiuqing, *See* Chen Bingxian, 17:31602
Gao, J., Analytical formulas for the resonant frequency changes due to opening apertures on cavity walls, 17:31505 (R;FR)
Garcia, G.V., A method of noncontacting ultrasonic process monitoring, 17:31262 (PA;US)
Garcia, K.M., *See* Shapiro, C., 17:30663
Garcia, P., Automated dry powder dispenser for explosive components, 17:31640 (R;US)
Garcia-Otero, E., *See* Dolan, T.J., 17:32457
Garcia-Recio, C., Response functions for infinite fermion systems with velocity dependent interactions, 17:32230 (R;FR)
Gardes, D., *See* Jouan, D., 17:32313
Gardner, C., *See* Ahrens, L., 17:31476
Gardner, N.C., *See* Keyvani, M., 17:31297
Gardosh, M., A reevaluation of the lake sediment chronology in the Dead Sea basin based on new ^{230}Th/U dates, 17:31702 (IA;IL)
Gareev, F.A., Analysis of discrete ambiguities for $\pi N \Delta$ and $\rho N \Delta$ vertex functions using inclusive charge-exchange reactions, 17:32256 (IA;DE)
  See Ratis, Yu.L., 17:32192
Garfagnini, R., *See* Arvieux, J., 17:32154
Garg, U., Electromagnetic properties of ^{181}Ir: Evidence of β-stretching?, 17:32242 (R;US)
Garisto, F., Source term models for the release of radionuclides from used nuclear fuel, 17:30726 (RA;SE)
Garisto, N.C., *See* Garisto, F., 17:30726
Garland, J.A., Coastal resuspension, 17:31684 (R;GB)
Garner, F.A., ASTM international symposium on small specimen test techniques and their applications to pressure vessel annealing and plant life extension, 17:30948 (R;US)
  Influence of cold work level on the irradiation creep and creep rupture of titanium-modified austenitic stainless steels, 17:31237 (R;US)
  Isotopic tailoring with ^{59}Ni to study the effect of helium on microstructural evolution and mechanical properties of neutron-irradiated Fe-Cr-Ni alloys, 17:32466 (R;US)
  See Edwards, D.J., 17:32467
Garnett, R., *See* Johnson, K.F., 17:31512
Garrett, J.D., North American radioactive beam initiatives, 17:31430 (R;US)
  See Lee, I.Y., 17:32243
Gasanov, E.M., *See* Alimov, R., 17:31594
Gaspar, S.M., *See* Milner, L.M., 17:31419
Gates, D.D., Pilot- and field-scale uranium lysimeter studies at the Oak Ridge Y-12 Plant, 17:30754 (R;US)
Gauthier, J.H., Total System Performance Assessment Code (TOSPAC): Volume 2, User's guide: Yucca Mountain Site Characterization Project, 17:30717 (R;US)
  See Barnard, R.W., 17:30719
Gauvain, J., *See* Hueber, C., 17:30873
Gauvin, H., *See* Jouan, D., 17:32313
Gavrilov, K.A., *See* Maslov, O.D., 17:31724
Gavrilov, V.P., *See* Rodean, H.C., 17:31677
Gavrilyuk, V., *See* Danilov, S., 17:31788
Gavron, A., *See* Waters, L., 17:32348
Gaydosh, M., 3-dimensional bundle adjustments in industrial metrology: A comparison, 17:31525 (R;US)
Gayle, T.M., *See* Jenkins, R.A., 17:31642
Gazza, C.J., *See* Ceccatto, H.A., 17:32389
Geerinck, J., *See* Emden, W. van, 17:31519
Gehl, A.C., Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences, 17:31025 (R;US)
Gehrbish, Sh., Multielemental gamma activation analysis of copper-molybdenum ores and its production of processing using microtron, 17:31301 (R;SU;In Russian)
Gehring, J., *See* Wuosmaa, A.H., 17:31540, 17:32212
Geiger, G.T., Particle blockage and flow degeneration in Savannah River Site reactor fuel/target assemblies, 17:31033 (R;US)
  Thermal hydraulic performance of naturally aspirated control rod housing assemblies, 17:31034 (R;US)
Geissel, H., *See* Bernas, M., 17:32228
Geist, G.A., *See* Stocks, G.M., 17:31215
Geist, W.M., Quark-gluon plasma searches: today and tomorrow, 17:32131 (R;FR)
Geller, J., *See* Soukas, A., 17:31477
Gemmell, H.G., *See* Smith, T., 17:31773
Geng Yongzhi, *See* Liu Keliang, 17:31872
Genicot, J., *See* Bonne, A., 17:30687
Genoux-Lubain, A., *See* Stuttge, L., 17:32280
Gentleman, J., *See* Muller, J., 17:31934
George, J.S., Functional MRI studies of human vision on a clinical imager, 17:31849 (R;US)

See Gorodnitsky, I., 17:31850
Georget, Y., *See* Anne, R., 17:31484
Geras'kin, S.A., *See* Sarapul'tsev, B.I., 17:31979
Geraud, A., *See* Dubois, M.A., 17:32458
Gerding, M.J., Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report, 17:31131 (R;US)
Gerjarusak, S., Coal plasticity at high heating rates and temperatures: Second technical progress report for the third quarter 1990, 17:30440 (R;US)
Gerlach, M., Description of hydrogeological data in SKB's database GEOTAB. Version 2, 17:30756 (R;SE)
German, U., *See* Ben-Shachar, B., 17:31589
Gervino, G., *See* Anghinolfi, M., 17:31530
Getino, C., *See* Darsey, J.A., 17:31312
Geyh, M., *See* Issar, A., 17:31712
Ghafouripour, A.K., *See* Dewanjee, M.K., 17:31801, 17:31821, 17:31842, 17:31913, 17:31921
Ghedira, L., *See* Bocquet, J.P., 17:32312
Ghis, A., *See* Villegier, J.C., 17:31251
Giannini, M.M., Photoreactions on the nucleus and on the nucleon with polarized photons, 17:32311 (RA;FR)
Gibson, H.E., *See* Wright, R.M., 17:31506
Gidal, G., *See* Cords, D., 17:32181
Gidaspow, D., Dense transport and fluidization of solids using kinetic theory, 17:30530 (RA;US)
Gierszewski, P.J., *See* Sullivan, J.D., 17:32445
Gilbert, E.S., Issues in risk assessment and modifications of the NRC health effects models, 17:31998 (R;US)
The assessment of risks from exposure to low-levels of ionizing radiation, 17:31995 (R;US)
See Brooks, A.L., 17:31997
See Fix, J.J., 17:31987
Gilev, A.I., *See* Artyukhov, V.I., 17:32429, 17:32430, 17:32431
Gill, E., *See* Ahrens, L., 17:31476
Gill, R.L., *See* Mantica, P.F., 17:32245
Gillen, V.A., IAEA inspections and Iraq's nuclear capabilities, 17:30767 (I;XA)
Gillespie, L., Standards for burrs?, 17:31233 (R;US)
Gillette, J.L., *See* Szpunar, C.B., 17:30419, 17:30554, 17:30555, 17:30556, 17:30557, 17:30558, 17:30559, 17:31070, 17:31071
Gillisert, D., *See* Colombo, R., 17:30820
Gillie, K.R., *See* DeLuca, W.H., 17:31043
Gilman, S.C., *See* Rosenstraus, M.J., 17:31832
Gilpatrick, J.D., *See* Johnson, K.F., 17:31512, 17:31513
See Wells, F.D., 17:31510
See Wright, R.M., 17:31506
Ginatempo, B., *See* Stocks, G.M., 17:31215
Ginevan, M.E., A flexible computer model for radon daughter exposure health risk assessment, 17:31938 (IA;CA)
Gingrich, J.E., The development of track etch dosimeters for measuring radon daughter exposures, 17:31556 (IA;CA)
Giorni, A., *See* Desesquelles, P., 17:32268
Gioumousis, A., *See* Briggs, D., 17:31497
Giovannelli, G., *See* Paganelli, G., 17:31816
Girardi, G., *See* Binetruy, P., 17:32119
Girdler, R.M., Visit of Wayne Hazen, Los Alamos October 15–16, 1952, 17:31356 (R;US)
Giusti, C., *See* Boffi, S., 17:32264
Givler, R.C., *See* Altobelli, S.A., 17:30519
Gjoetterud, O.K., *See* Andaas, H.E., 17:32045
Gladney, L., *See* Cords, D., 17:32181
Gladyshev, V.A., Study of characteristics of flat scintillation detectors with a fiber optics light guide for the multilayer charged-particle ΔE-spectrometer, 17:31572 (RA;SU;In Russian)
Gladysz-Dziadus, E., *See* Bartke, J., 17:32293
Glaeb, F., Research on backfilling and sealing of Rooms and Galleries in a repository in salt, 17:30696 (R;FR;In German)
Glagola, Happ, T., *See* Wuosmaa, A.H., 17:31540
Glagola, P.G., *See* Wuosmaa, A.H., 17:32212
Glaser, M., *See* Stuttge, L., 17:32280
Glashausser, C., *See* Morlet, M., 17:32314
Glaumann, M., The energy balance of sloping glazings: Simple empirical correlations between the energy flow through a triple glass roof and the outdoor climate, 17:30827 (R;SE;In Swedish)
Glazov, A.A., Accelerating system simulation of U-200T isochronous cyclotron, 17:31436 (R;SU;In Russian)
Geometry choice and calculation of the U-200T isochronous cyclotron accelerating system, 17:31491 (R;SU;In Russian)
See Alenitskij, Yu.G., 17:31435
Gleason, T.C.J., Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems, 17:31059 (R;US)
Gledenov, Yu.M., *See* Andzheevski, Yu.A., 17:32333
Glendinning, S.G., *See* Kilkenny, J.D., 17:32478
Glenn, J.W., *See* Ahrens, L., 17:31476
Glenn, S., *See* Dewanjee, M.K., 17:31801, 17:31821
Gobin, R., *See* Courtois, A., 17:32275
Godfrey, G., *See* Bulos, F., 17:31522
Godlewski, J., A new method for residual stress distribution - analysis of corroded zircaloy-4 cladding, 17:31208 (R;FR)
Goeke, K., *See* Gorski, A.Z., 17:32138
Goethals, P., *See* Poupeye, E., 17:31819
Goethe, M.C., *See* Cole, M.J., 17:31621
Goetsch, B., *See* Parrott, L., 17:31062
Goff, F., *See* Duchane, D.V., 17:30838
Golas, D.B., *See* Coursey, B.M., 17:31884
Gold, M.S., *See* Cords, D., 17:32181
Goldhaber, G., *See* Cords, D., 17:32181
Goldhirsch, I., Computational modeling of granular flow dynamics: Clustering instability in granular gases, 17:30526 (RA;US)
Golding, L.J., *See* Cords, D., 17:32181
Goldstone, J.A., *See* Lawson, A.C., 17:32041
Goleminov, N.G., Investigation of soft errors in VLCIC RAM under influence of heavy ions, 17:31604 (R;SU;In Russian)
Golightly, M.J., *See* Hardy, K.A., 17:31597
Golis, M.J., VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)
Golokhvastov, A.I., Triggering system for relativistic hypernuclei detection, 17:31575 (R;SU;In Russian)
See Avramenko, S.A., 17:32331
Golovatyuk, V.M., *See* Vodop'yanov, A.S., 17:31573
Golubeva, M.B., *See* Gladyshev, V.A., 17:31572
Golz, J.W., *See* Halpern, B.L., 17:31081
Goncharenko, O.N., *See* Gladyshev, V.A., 17:31572
Gondrand, J.C., *See* Bocquet, J.P., 17:32312
Goniche, M., *See* Litaudon, X., 17:32423
Gonzalez Mateu, D., Geologichal effectiveness of nuclear trace method in uranium prospecting, 17:31543 (I;CU;In Spanish)
Gonzalez, C., Improvement and validation of tellurium transport models in the RAFT code, 17:30946 (RA;JP)
Gonzalez, G., *See* Oliva, J.P., 17:31834
Good, M.S., *See* Doctor, S.R., 17:30921, 17:31022
Goodall, J.A.B., *See* Burns, W.G., 17:30876
Goodlett, D.R., *See* Wahl, J.H., 17:31763
Goodman, M.M., *See* Smith, G.T., 17:31900
Goomer, N.C., Synthesis and evaluation of technetium-99m monocationic mixed ligand complexes of phenyl substituted/condensed tetradentate Schiff's bases and trimethylphosphine, 17:31780 (RA;US)
Gorban', L.M., Modelling of freon heat transfer in water under supercritical pressure, 17:31392 (R;SU;In Russian)
Gordelij, V.I., Generalization of Schroedinger equation to the Boltzmann phase space, 17:32039 (R;SU;In Russian)
Gordon, E.E., *See* Kasi, L.P., 17:31787
Gorenstein, M.I., *See* Rischke, D.H., 17:32220
Gorham, E.D., *See* Harper, F.T., 17:31401
Gorodetzky, P., NA 38 future, 17:32135 (IA;DE)
Gorodnitsky, I., A weighted iterative algorithm for neuromagnetic imaging, 17:31850 (R;US)
Gorski, A.Z., Nucleon electric form factors and quark sea polarization in the Nambu-Jona-Lasinio model, 17:32138 (IA;DE)
Gotoh, S., Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations, 17:31259 (R;US)
Gottwald, S., Realization of a Lagrange-simulation model for dispersion calculations, 17:31649 (R;DE;In German)

Govorov, A.I., *See* Borovkov, D.P., 17:31437
Govorun, R.D., Modifying influence of DNA synthesis inhibitors on the effect of irradiation of Chinese hamster cells, 17:31968 (RA;SU)
Grabowski, Z.W., Gamma spectroscopy of multiple nucleon transfer reactions in Sn, 17:32240 (R;US)
See Daly, P.J., 17:32272
Grabsky, V.H., *See* Adamian, F.V., 17:32310
Graczyk, D.G., *See* Essling, A.M., 17:31286
Gradechny, Ch., *See* Blashchak, Z., 17:31579
Graham, M.C., *See* Daghighian, F., 17:31902
Grambow, B., What do we know about nuclear waste glass performance in the repository near field?, 17:30725 (RA;SE)
Grandati, Y., Variational principle in stochastic quantization and 1/N expansion, 17:32072 (R;FR)
Grange, P., *See* Grandati, Y., 17:32072
Grangeat, P., *See* Delageniere, S., 17:31770
Granier, T., *See* Escalier des Orres, P., 17:30658
Granovskij, V.B., *See* Bystritskij, V.M., 17:31232
Grant, K., A correlated K-distribution model of the heating rates for CH_4 and N_2O in the atmosphere between 0 and 60 km, 17:31676 (R;US)
Grasso, A., *See* Arvieux, J., 17:32154
Gray, D.H., *See* Coursey, B.M., 17:31884
Gray, L.W., Aqueous phase oxidation techniques as an alternative to incineration, 17:31322 (R;US)
Green, A., *See* Morlet, M., 17:32314
Green, T.H., *See* Findlay, D.J.S., 17:30688
Greene, C.H., Physics of correlated systems: Progress report, December 1, 1991–November 30, 1992, 17:32358 (R;US)
Greene, D.L., *See* Deluchi, M., 17:31187
Greene, J.M., *See* Jardin, S.C., 17:32403
Greenwood, L.R., *See* Garner, F.A., 17:32466
Greenwood, M.S., *See* Doctor, S.R., 17:31022
Greer, G.S., Nuclear Security Systems Center, 17:30775 (R;US)
Transportation Systems Center, 17:30647 (R;US)
Gregg, D.W., *See* Gray, L.W., 17:31322
Gregoire, C., *See* Jouan, D., 17:32313
Greig, D.R., *See* Kupferschmidt, W.C.H., 17:31340
Greiner, N.R., Detonation reactions frozen by free expansion and analyzed by mass spectrometry, 17:31631 (R;US)
Greiner, W., *See* Rischke, D.H., 17:32220
See Sailer, K., 17:32095
Griffin, T.W., *See* Hnatowich, D.J., 17:31831
Griffith, J., *See* Diaz Rizo, O., 17:31688
Griffith, R.O., *See* Allen, M.D., 17:30899
See Pilch, M., 17:31030
Grigorenko, S.V., Variational characteristics of ion injector for a linear accelerator, 17:31518 (R;SU;In Russian)
Grimes, R.W., *See* Merriam, N., 17:30421
Grimm, R., *See* Binetruy, P., 17:32119
Grindrod, P., NAPSAC technical document, 17:31742 (R;SE)
Grivaz, J.F., Prospects for supersymmetry discoveries at a 500 GeV e^+e^- collider, 17:32172 (R;FR)
Groen, Oe., Gravitational effect of the quantum vacuum outside a cosmic string, 17:32127 (R;NO)
Groenfors, K., *See* Malaska, P., 17:31090
Grogan, D., *See* Bradley, R.P., 17:30616
Grogan, H.A., Testing near-field models for deep disposal, 17:30732 (RA;SE)
Grohmann, K., *See* Spindler, D.D., 17:30807
Gross, M.D., *See* Plotzke, K.P., 17:31784
Gross, R.E., Engineering evaluation of the General Motors (GM) diesel rating and capabilities, 17:31040 (R;US)
Grosse, E., *See* Senger, P., 17:32296
Grossman, A.S., *See* Grant, K., 17:31676
Grossman, G., *See* DeVault, R.C., 17:31096
Grubelich, M.C., A smoke producing rocket motor for atmospheric wind profiling, 17:31627 (R;US)
Gruemmer, F., *See* Gorski, A.Z., 17:32138
Grundfelt, B., *See* Elert, M., 17:30749
Grundstroem, A., *See* Maekilae, M., 17:30487, 17:30501
Gruppelaar, H., Short status report on EFF and EAF projects: Presented at the Topical Conference on Nuclear Data for Fusion Reactor Technology, NEANDC Meeting, Karlsruhe, October 22, 1991, 17:32453 (R;NL)
See Kopecky, J., 17:32216
See Nordborg, C., 17:30940
See Uhl, M., 17:32282
Gschwend, P.M., Colloids in groundwater: Their mobilization, subsurface transport, and sorption affinity for toxic chemicals: Annual technical progress report, 17:31751 (R;US)
Gu Baming, *See* Yang Juncheng, 17:31689
Gu Biao, *See* Duan Shuyun, 17:32401
Gu Shiliang, *See* Yang Hefeng, 17:31855
Guadagni, A., *See* Mariani, G., 17:31817
Guan Weishu, *See* Duan Shuyun, 17:32401
Guaraldo, C., *See* Anghinolfi, M., 17:31530
Gudewicz, P., Capacitive beam position monitors and automatic beam centering in the transfer lines of Ganil, 17:31453 (R;FR)
Gudhe, R., *See* Rajagopal, K.R., 17:30529
Gudima, K.K., Hadronic sources of dileptons from heavy ion collisions at intermediate and relativistic energies, 17:32299 (IA;DE)
Gudkov, I.N., AET and MEA affect on chromosomal aberrations occurrence in root meristems under γ-irradiation of plants within wide dose range from stimulatory up to superlethal doses, 17:31980 (RA;SU;In Russian)
Guentay, S., Analysis of iodine source term from a small BWR during a postulated severe accident using IMPAIR 2/M code, 17:30875 (RA;JP)
Guethlein, G., *See* Eder, D.C., 17:31425
Guidotti, R.A., Evaluation of flotation for purification of pyrite for use in thermal batteries, 17:31045 (R;US)
Guillot, J., *See* Morlet, M., 17:32314
Guillou, P., Study of the extraction and the purification of americium and trivalent actinides contained in effluents with supported liquid membranes, 17:31333 (R;FR;In French)
Gulamova, R.R., *See* Alimov, R., 17:31594
Gunion, J.F., *See* Barnett, R.M., 17:32152
Gunnink, R., *See* Ruhter, W.D., 17:30776
Guo Shusheng, *See* Wu Bingzhe, 17:30955
Guo Yuhua, *See* Chen Xiaomei, 17:31873
Guo-Huan Dai, *See* Dolveck, J.Y., 17:32370
Guppy, J.G., *See* Horak, W.C., 17:30998
Gupta, R., *See* Dewanjee, M.K., 17:31801, 17:31821
Gupta, R.P., *See* O'Brien, W.S., 17:30459
Gusev, V.V., Scattering problem with complex potential as a problem with zero boundary values and its solution with finite element method, 17:32091 (R;SU;In Russian)
Gustafsson, S., Optimization of the heat recovery system of a paper machine, 17:31123 (R;FI)
Guttormsen, M., SIRI - A proposal for a multi-detector ΔE-E particle telescope, 17:31599 (R;NO)
Guy, F.W., *See* Johnson, K.F., 17:31512
Guyonnet, J.L., *See* Arnold, R., 17:31547
Gvirtzman, G., *See* Mor, D., 17:31713
Gyoerffy, B.L., *See* Stocks, G.M., 17:31215

H

Haakansson, L., *See* Andersson, Arne, 17:31736
Haan, S.W., *See* Kilkenny, J.D., 17:32478
Haange, R., *See* Hircq, B., 17:32440
Haapakoski, M., Residential electricity consumption, 17:31118 (R;FI;In Finnish)
Haas, J.B.M. de, *See* Freudenreich, W.E., 17:31847, 17:31848
Haas, P.A., A new apparatus for continuous countercurrent flow of solids and liquids, 17:31124 (R;US)
Haase, C.S., Work plan for the preliminary assessment and characterization of dense nonaqueous-phase liquids in the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Oak Ridge Y-12 Plant, 17:30745 (R;US)
Haber, H.E., *See* Barnett, R.M., 17:32152
Haber, S.B., Outage management: A case study, 17:31001 (R;US)
See Shurberg, D.A., 17:31000
Haberzettl, H., *See* Lehman, D.R., 17:32205
Hackley, K.C., *See* Chou, M.I.M, 17:30458

See Rapp, D.M. Ehrlinger, H.P., 17:30426

Hadjiyannakis, A., *See* Kwok, C.S., 17:31894

Haeffner, D.R., *See* Macrander, A.T., 17:31614

Haenninen, P., The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 7, 17:30497 (R;FI;In Finnish)

The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 8, 17:30510 (R;FI;In Finnish)

The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 9, 17:30516 (R;FI;In Finnish)

Utilization of ADP in peat inventory and research, 17:30491 (R;FI;In Finnish)

Haffenden, R., *See* Tanzman, E.A., 17:31195

Haftel, M.I., *See* Fabre de la Ripelle, M., 17:32354

Hagen, E.W., *See* Gehl, A.C., 17:31025

Haggard, R.A., *See* O'Rourke, P.E., 17:31611

Haggerty, J., *See* Cords, D., 17:32181

Haghgoole, M., *See* Cowart, J.S., 17:31159

Hairapetian, A.V., *See* Adamian, F.V., 17:32310

Hajek, B.K., Installation and evaluation of a nuclear power plant operator advisor based on artificial intelligence technology: Interim progress report and second year development plan, 17:30957 (R;US)

Hakkila, E.A., *See* Nishida, K., 17:30772

Hakopian, H.H., *See* Adamian, F.V., 17:32310

Halama, J., *See* Stabin, M.G., 17:31903

Halbig, J.K., *See* Sprinkle, J.K. Jr., 17:30760

Halbrook, R.S., *See* Shugart, L.R., 17:31692

Hall, S., *See* Andresen, H., 17:32261

Hall, T.E., *See* Collins, H.D., 17:31625

Halleroed, P., Investigation of an electrical converter system with an induction generator for variable speed operation of a wind turbine, 17:30860 (R;SE)

Halloran, J.W., *See* Wei, Wen-Cheng J., 17:31273

Hallsby, G., *See* Eriksson, H., 17:30813

Halpern, B.L., Jet vapor deposition of thin films for solid oxide and other fuel cell applications, 17:31081 (R;US)

Hamby, C., *See* Lauf, R.J., 17:31253

Hamel, W.R., *See* Wintenberg, A.L., 17:31354

Hamilton, L.F.M., Progress report of the 600 m borehole project of the CEC programme on management and storage of radioactive waste: January-June 1991, 17:30679 (R;NL)

Hamilton, M.L., *See* Edwards, D.J., 17:32467

See Garner, F.A., 17:30948, 17:31237, 17:32466

Hamilton, V.T., *See* Rogers, Y.C., 17:31305

Hammel, B.A., *See* Kilkenny, J.D., 17:32478

Hammer, J., *See* Chawla, R., 17:30995

Han Bing, Spatial filtring and thermocouple spatial filter, 17:31605 (R;CN;In Chinese)

See Li Rizhu, 17:30970

See Wu Shaorong, 17:31380

Han Liangbi, *See* Zuo Jiahong, 17:30888

Han Shiquan, *See* Zhang Peixuan, 17:31329

Han, J.H., Dynamics of the ion-ion acoustic instability in the thermalization of ion beams, 17:32050 (R;US)

Hanada, M., *See* Pamela, J., 17:32444

Hanaki, H., Focusing characteristics of an accelerating structure with non-circular beam holes, 17:31460 (R;FR)

Numerical design of an rf-coupling Iris, 17:31504 (R;FR)

Hanappe, F., *See* Jouan, D., 17:32313

Handly, B., LEOPARDSPOTS: Spectrum calc with depletion, 17:32532 (CM;US)

Handy, B.J., *See* Dutton, L.M.C., 17:30895

Handy, C.R., *See* Bessis, D., 17:32019

Hane, Hiroki, *See* Koori, Norihiko, 17:32322

Hanes, D.M., Experimental apparatus for the study of flowing granular materials, 17:30518 (RA;US)

Studies of granular flow down an inclined chute: Quarterly technical progress report, March 13, 1992–June 12, 1992, 17:30535 (R;US)

Hani, S., *See* Shukla, S.K., 17:31786, 17:31810

Hanratty, T.J., *See* Binder, J.L., 17:31383

Hansen, H., *See* Aarkrog, A., 17:31730

Hansen, N., *See* Horsewell, A., 17:32498

Hansen, N.R., Thermodynamically consistent theories for elastoplasticity coupled with damage, 17:31242 (R;US)

Hansen, O., *See* Moskowitz, B., 17:32286

Hanson, A.L., *See* Paschoa, A.S., 17:31951

Hanson, D.J., *See* Finley, S.J., 17:30718

Hanson, S.G., *See* Juul Rasmussen, J., 17:32499

Hantraye, Ph., *See* Bottlaender, M., 17:31798

See Maziere, B., 17:31797

Happ, Th., *See* Wuosmaa, A.H., 17:32212

Harada, H., *See* Whitlow, L.W., 17:32183

Harapanhalli, R.S., [^{35}S] cysteamine and 2-aminoethylisothiouronium bromide hydrobromide: Improved syntheses, biodistributions and implications of protection from radionuclides, 17:31919 (RA;US)

Hardin, A.K., Interim report - Production Test MR-105-12 crossheader purge with chromic acid, 17:30986 (R;US)

Harding, J., Federal Maglev program, 17:31162 (RA;US)

Hardy, A.C., *See* Hardy, K.A., 17:31597

Hardy, K.A., Space Shuttle dosimetry measurements with RME-III, 17:31597 (RA;US)

Hare, F.K., The safety of Ontario's nuclear power reactor. A scientific and technical review. Report to the Minister, 17:30905 (I;CA;In English, French)

The safety of Ontario's nuclear power reactors. A scientific and tecnical review. Vol. 1: Report to the Minister, technical report and annexes, 17:30906 (I;CA)

The safety of Ontario's nuclear power reactors. A scientific and technical review. Vol. 2: Appendices, 17:30908 (I;CA)

The safety of Ontario's nuclear power reactors. A scientific and technical review. Selected consultants' reports, 17:30909 (I;CA)

Harlavan, Y., Ar-Ar age measurements on clay minerals from the Paleozoic section in southern Israel, 17:31703 (IA;IL)

Harmon, C.D., Ground test facility for SEI nuclear rocket engines, 17:30917 (R;US)

Harmon, J.E., Evolution of the scientific paper, 17:32571 (R;US)

Harms, S.L., *See* Longhurst, G.R., 17:32456

Harold, M.P., Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992, 17:31315 (R;US)

Harper, F.T., Simulation of liquid drop breakup behavior in a flow field using discrete element techniques, 17:31401 (R;US)

Harper, P.V., In vivo metabolism of I-123 labeled semisynthetic low density lipoproteins: Final technical report, September 28, 1988–September 27, 1990, 17:31776 (R;US)

Special aspects of positron dosimetry, 17:31899 (RA;US)

See Hay, R.V., 17:31892

See Lathrop, K.A., 17:31885

Harpring, J.R., Inspection of irradiated Mark 18 fuel tubes, 17:30976 (R;US)

Harradine, D.M., *See* Dyer, R.B., 17:31630

Harris, D.R., *See* Kupferschmidt, W.C.H., 17:31340

Harris, J.H., *See* Uckan, T., 17:32433

Harrison, J.D., *See* Naylor, G.P.L., 17:31881

Harrison, M., *See* Wei, J., 17:31447

Hart, V.E., *See* Jackson, H.E., 17:31471

Hartley, R.S., Recommendations on frequently encountered relief requests, 17:30942 (R;US)

See Anderson, M.T., 17:31010

Hartman, C.W., *See* Moir, R.W., 17:32471

Harvey, A., Mechanical equipment for magnet measurement and alignment, 17:31523 (R;US)

Harvey, G.L., Media information review, January–June 1992: Hanford Environmental Dose Reconstruction Project, 17:32001 (R;US)

Harvey, M., *See* Andrews, H.R., 17:31032

Harvey, R.D., *See* Chou, M.I.M, 17:30458

Hasegawa, Mitsuru, *See* Azumi, Masafumi, 17:32460

Hashimoto, T., Structural analysis of thermal fatigue failures on rocket combustion chambers by the finite element method, 17:31407 (R;JP)

Hassan, M.A., *See* Hussein, H.A., 17:30612

Hatchett, S.P., *See* Kilkenny, J.D., 17:32478

Hauff, T.W., Chemical decontamination of Hanford production reactors, 17:30990 (R;US)

Haupt, W., *See* Reimk, 17:30625
Hauschildt, P.H., *See* Starrfield, S., 17:32058
Hautojaervi, A., *See* Elert, M., 17:30749
Haverland, G.W., *See* Wiebe, L.I., 17:31915
Havstad, M.A., Heat transfer in a liquid metal crucible with an integral blackbody cavity, 17:31402 (R;US)
Hawk, R., *See* Demmer, R., 17:30763
Hawkins, H.R., *See* Overbey, W.K., 17:30588
Haworth, J., *See* Smalinskas, K., 17:31202
Hawrynski, M.J., Experimental verification of the theory of clusters, 17:31947 (IA;CA)
The dynamic theory of clusters, 17:31944 (IA;CA)
Hawsey, R.A., National laboratories and CRADAs: Summary, 17:31060 (R;US)
Hawthorne, J.R., Accelerated irradiation test of gundremmingen reactor vessel trepan material, 17:30878 (R;US)
Haxton, W., Institute for Nuclear Theory annual report No. 2, 1 March 1991–29 February 1992, 17:32208 (R;US)
Hay, R.V., Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein, 17:31892 (RA;US)
Hayden, S.M., Neutron scattering studies of the spin dynamics in $La_{2-x}Sr_xO_4$, 17:32387 (R;US)
Hayes, E.E., T metal analytical samples, 17:31224 (R;US)
He Cexi, The research progress on plant mutant germplasm resources in China, 17:31859 (R;CN;In Chinese)
He Fengqi, Nondestructive testing of bonding of low enriched uranium elements by using ultrasonic phase-amplitude technique, 17:30952 (R;CN)
He Zhentian, *See* Yang Hefeng, 17:31855
He, Jianliang, *See* Hull, J.R., 17:31165
Heames, T.J., *See* Powers, D.A., 17:31031
Hessler, P.G., *See* Doctor, S.R., 17:30921, 17:31022
Heck, H.G., *See* Rosocha, L.A., 17:31662
Hedman, G., Techniques for separation of green parts, and nutrient content in green parts, 17:30814 (R;SE;In Swedish)
Hedman, I., *See* Anderson, S.E., 17:31285
Heer, W., *See* Frick, U., 17:31729
Heffner, J.D., Technical summary of groundwater quality protection program at the Savannah River Site (1952–1986): Volume 2, Groundwater monitoring results, 17:31696 (R;US)
Heide, B., *See* Kaempfer, B., 17:32141
Heijdra, J.J., Comparative analysis of borehole interaction in the HAW test field, 17:30680 (R;NL)
Convergence measurements in a 300 m deep borehole in rock salt, 17:30684 (R;NL)
Heikel Vinther, F., *See* Majborn, B., 17:32500
Heikkinen, L., *See* Yrjoelae, J., 17:31113
Heil, W., Compression of polarized ^{3}He, 17:31487 (RA;FR)
Heinisch, H.L., *See* Garner, F.A., 17:30948
Heinmann, A., *See* Starinsky, A., 17:31714
Heintzenberg, J., Air monitoring in the Arctic: 1980-90, 17:31672 (R;SE)
Heinz, R., *See* Bower, C., 17:32069
Heise, S., *See* Psarros, N., 17:30641
Hellman, R.S., *See* Ozker, K., 17:31781
Hellmann, S., Large-scale experiments on iodine release associated with coolant flashing due to ruptured high-pressure tubes, 17:30945 (RA;JP)
Helms, C., A temperature tracking SPICE2G.6 macromodel of the 6N134 optocoupler, 17:31418 (R;US)
Hemsworth, R., *See* Pamela, J., 17:32442, 17:32443
Henderson, D.J., *See* Wuosmaa, A.H., 17:31540, 17:32212
Henge-Napoli, M.H., In vitro and in vivo bioassay applied to uranium trioxide, 17:31989 (RA;US)
Henley, E.M., *See* Haxton, W., 17:32208
Hennequin, P., Anharmonicity in resonant perturbations and its effect on stochasticity extension, 17:32425 (R;FR)
Henning, W., *See* Ostendorf, R., 17:32253
See Senger, P., 17:32296
Henriksson, G., *See* Gustafsson, S., 17:31123
Henry, E.A., *See* Brinkman, M.J., 17:31601
Henry, J., *See* Hokin, S., 17:32413
Henry, J.S., *See* Prager, S.C., 17:32412
Henshaw, J., *See* Bowsher, B.R., 17:30872
Henson, T.J., *See* Jennings, T.L. Jr., 17:31217
Hepworth, M.T., Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990, 17:30476 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991, 17:30477 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991, 17:30478 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, June 1, 1991–August 31, 1991, 17:30479 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991, 17:30480 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990, 17:30482 (R;US)
Herbert, A., Modelling for the Stripa site characterization and validation drift inflow: prediction of flow through fractured rock, 17:31743 (R;SE)
See Grindrod, P., 17:31742
Herman, D.T., *See* Paul, P.K., 17:30950
Herman, H., *See* Ray, E.R., 17:31083
Herman, R.G., *See* Klier, K., 17:30483
Hermes, R., *See* Shukla, S.K., 17:31786, 17:31810
Herranen, T., *See* Virtanen, K., 17:30489, 17:30507
Herrerra, E., *See* Diaz Rizo, O., 17:31688
Herrmann, J., *See* Jansson, M., 17:31758
Herrmann, M., Properties of the ρ-meson in dense nuclear matter, 17:32224 (IA;DE)
Herut, B., ^{36}Cl in rainwater in Israel, 17:31704 (IA;IL)
The isotopic composition of strontium in Israeli rains, 17:31705 (IA;IL)
Hesch, V.L., Sample holder for x-ray diffractometry, 17:31600 (PA;US)
Hester, M., Analysis of plasma-treated wire insulation, 17:31622 (R;US)
Heston, W.M., Scintillation counter: Moderator purification, 17:30977 (R;US)
Hetrick, D.M., *See* Fu, C.Y., 17:32284
Heuer, D., *See* Desesquelles, P., 17:32268
Hewitt, K.A., *See* Chan, G.L.Y., 17:31845
Hickman, A.P., *See* Faris, G.W., 17:32479
Hickman, K.C., *See* Milner, L.M., 17:31419
Hickman, R.G., Electrodialysis and electrohydrolysis applied to Hanford single tank wastes, 17:30736 (R;US)
See Gray, L.W., 17:31322
Hiemisch, H., *See* Danilov, S., 17:31788
Higley, B., *See* Smith, T., 17:31773
Hill, C.E., *See* Marshall, T.O., 17:31591
Hill, D.N., *See* Allen, S.L., 17:32474
See Jong, R.A., 17:32475
Hills, J.G., *See* Leonard, P.J.T., 17:32053
Hiltunen, J.V., ^{153}Sm-EDTMP and ^{99m}Tc-EDTMP - The radiopharmacology of two potential bone metastasis radiopharmaceuticals, 17:31914 (RA;US)
See Nikula, T.K., 17:31792
Hinchliffe, I., *See* Barnett, R.M., 17:32152
Hinsey, N., *See* Yoo, C.S., 17:31283
Hinton, D.L., Evaporation of nonazeotropic mixture of refrigerants R143a and R124 flowing inside smooth and corrugated tubes, 17:31386 (R;US)
Hirano, Masashi, *See* Watanabe, Tadashi, 17:31394
Hircq, B., Technology and component development for a closed tritium cycle, 17:32440 (R;FR)
Hirschon, A.S., Synthesis of model compounds for coal liquefaction research: Quarterly report No. 1, June 21, 1990–September 20, 1990, 17:30453 (R;US)
Hjort-Jensen, M., Isobar contributions to the imaginary part of the optical-model potential for finite nuclei, 17:32270 (R;NO)

Perturbative many-body approaches to finite nuclei, 17:32239 (R;NO)
Hlavac, S., *See* Kugler, A., 17:31566
Hmelo, A.B., *See* Milewski, J.O., 17:31406
Hnatowich, D.J., Improved localization of tumor with streptavidin and labeled biotin as a substitute for antibody, 17:31830 (RA;US)
Pharmacokinetics of an anti-CEA antibody radiolabeled with ^{111}In via DTPA and with ^{99m}Tc via two direct labeling methods: A comparison in patients, 17:31831 (RA;US)
See Mardirossian, G., 17:31807
See Rusckowski, M., 17:31838
Ho, C., In vivo studies of ethanol on prolactin and luteinizing hormone in rats, 17:32003 (RA;US)
Ho, K.P., *See* Ching, S.H., 17:31952
Ho, W., Photochemical dynamics of surface oriented molecules: Progress report, August 1, 1991–July 31, 1992, 17:31323 (R;US)
Hoang, G.T., *See* Litaudon, X., 17:32423
Hobbs, M.L., Nonideal thermoequilibrium calculations using a large product species data base, 17:31635 (R;US)
Hockey, R.L., *See* Doctor, S.R., 17:30921, 17:31022
Hoefer, R., *See* Yu, J., 17:31846
Hoehn, E., *See* Frick, U., 17:31729
Hoejerup, C.F., *See* Majborn, B., 17:32500
Hoekmark, H., *See* Pusch, R., 17:30733, 17:31738
Hoekstra, P., Characterization of reservoir rocks and fluids by surface electromagnetic transient methods: Annual report, January 1991–January 1992, 17:30561 (R;US)
Hoenig, D.L., *See* Krikorian, O.H., 17:30735
Hoffschir, D., Targeting of macrophages for the scintigraphic evaluation of inflammatory lesions in a model of radio-induced inflammation in pigs, 17:31769 (R;FR)
Hofmann, W., *See* Steinhausler, F., 17:31933
Hogenbirk, A., *See* Verschuur, K.A., 17:32449
Hokin, S., Anomalous ion heating and superthermal electrons in the MST reversed-field pinch, 17:32413 (R;US)
Hokin, S.A., *See* Prager, S.C., 17:32412
Hoktanian, V.K., *See* Adamian, F.V., 17:32310
Holan, G., *See* Cholewa, M., 17:31852
Holcombe, C.E., *See* Lauf, R.J., 17:31253
Holder, L. Jr., *See* Ford, M.K., 17:31027
Holland, J., *See* Janoki, Gy.A., 17:31804
Holly, D., *See* Hokin, S., 17:32413
Holly, D.J., *See* Prager, S.C., 17:32412
Holm, E.L., Circulating fluidized bed with optimal control of process parameters to achieve better environmental conditions and flexibility in operation, 17:31408 (I;DK)
Holmen, K., *See* Heintzenberg, J., 17:31672
Holmes, A.J.T., *See* Pamela, J., 17:32442, 17:32443
Holoye, P., *See* Kasi, L.P., 17:31787
Holstein, F., Growing energy: A national economy analysis of energy from arable land, 17:30811 (R;SE;In Swedish)
Holt, A., *See* Hjort-Jensen, M., 17:32239
Holt, J.B., Combustion synthesis method and products, 17:31261 (PA;US)
Holten, J.W. van, BRST field theory of relativistic particles, 17:32465 (R;NL)
Holtzapple, R., *See* Bulos, F., 17:31522
Holub, R.F., Radon transport into underground openings, 17:31721 (IA;CA)
See Bates, R.C., 17:31723
See Borak, T.B., 17:30615
Holzmann, R., *See* Ostendorf, R., 17:32253
Homann, C., *See* Bottoni, M., 17:31395
Homma, Kozo, Reassessment of fuel failure behavior in the SPERT and PBF experiments for irradiated fuel rods under reactivity initiated accident conditions, 17:30953 (R;JP;In Japanese)
See Yanagisawa, Kazuaki, 17:30896
Hong Zhongyuan, *See* Tian Jian, 17:30884
Hongquan, L., *See* Ri-Kai, W., 17:31564
Hope, A., *See* Knudsen, G., 17:31410
Hopke, P.K., Study of the atmospheric chemistry of raden progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992, 17:31912 (R;US)
Hopman, H., *See* Pamela, J., 17:32442, 17:32443
Hoppe, M.L., Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)
Hoppes, D.D., *See* Coursey, B.M., 17:31884
Horak, W., *See* Shier, W., 17:30999
Horak, W.C., Asymmetric flow events in a VEER 1000, 17:30998 (R;US)
Horiike, Hiroshi, *See* Murakami, Yoshiki, 17:32463
Horn, B.A. van den, Finite element analyses of a heater-interruption in the HAW test field, 17:30682 (R;NL)
Ovality of the steel lining in the HAW test field, 17:30683 (R;NL)
Horn, D., *See* Stuttge, L., 17:32280
Hornbrook, J.W., Visualization of foam/oil in a new, high resolution, sandstone replica micromodel, 17:30568 (R;US)
Hornung, M.O., CFC environmental problems and cooling technology, 17:31647 (R;DK;In Danish)
Horsewell, A., Materials Department. Annual report 1991, 17:32498 (R;DK)
Horton, W., *See* Han, J.H., 17:32050
Hosain, F., *See* Patel, H.B., 17:31800
Hoshino, Akira, *See* Kobayashi, Fumiaki, 17:30991
Hosseini, W., *See* Briggs, D., 17:31497
Hou Lanxin, *See* Zhao Wenhu, 17:31690, 17:31875
Hou Quanxiang, *See* Wang Yinju, 17:30954
Hou, S., *See* Klier, K., 17:30483
Houghton, D.C., *See* Jesson, D.E., 17:31268
Hourani, E., Fine structures in ^{14}C emission of ^{223}Ra and ^{224}Ra, 17:32248 (R;FR)
House, P.A., *See* Moir, R.W., 17:32471
Houssin, B., *See* Marini, B., 17:31209
See Soulat, P., 17:31207
Houston, J.R., DACRIN: Radiation organ dose from inhalation, 17:32536 (CM;US)
See Strenge, D.L., 17:32535
Howansky, H.C., New York State Maglev related programs, 17:31161 (RA;US)
Howard, J.B., *See* Darivakis, G.S., 17:30439
See Gerjarusak, S., 17:30440
Howe, G.R., *See* Nair, R.C., 17:31936
Howell, R.W., *See* Harapanhalli, R.S., 17:31919
Hu Liangyou, Development of ^{60}Co after-loading source, 17:30786 (R;CN;In Chinese)
Hu Qiyue, Study on the retention of enriched UO_2F_2 in the mouse and its radiogenotoxicological effects, 17:31876 (R;CN;In Chinese)
Hu Xien, Conceptual design of fixed bed burning system: A study of the head-end process for Th-U nuclear fuel cycle in HTGR, 17:30639 (R;CN;In Chinese)
See Dai Weizhi, 17:30923
Hu Zhihong, *See* Liu Nangai, 17:30785
Hu, Ke, Enhancement of ion transmission and reduction of background and interferences in inductively coupled plasma mass spectrometry, 17:31300 (R;US)
Huang Deyang, *See* Feng Mingquan, 17:30889
Huang Yucai, Development and research of in-core transducers at IAE (Institute of Atomic Energy), 17:31606 (R;CN;In Chinese)
Huang, H., *See* Hucka, V.J., 17:30470
Huang, H.S., Control of mercury emissions from coal-fired boilers, 17:30475 (R;US)
Huang, Lili, Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst, 17:30430 (R;US)
Huang, S.W., Subthreshold kaon production in 1 GeV/u Au+Au collision within quantum molecular dynamics, 17:32303 (IA;DE)
See Khoa, D.T., 17:32294
See Lehmann, E., 17:32305
See Puri, R.K., 17:32307
Hubbaard, B., *See* Barnett, R.M., 17:32152
Hubele, J., *See* Mueller, W.F.J., 17:32291
Hubner, K.F., *See* Smith, G.T., 17:31900
Hucka, V.J., Formation and retention of methane in coal: Final report, 17:30470 (R;US)
Hudson, C.L., *See* Norris, N.J., 17:31415
Hue, R., *See* Anne, R., 17:31484
Hueber, C., Validation of the IODE code on analytical experiments, 17:30873 (RA;JP)
Huettinger, M., *See* Leitha, T., 17:31802, 17:31814

Huff, E.A., *See* Essling, A.M., 17:31286
Huffman, G., *See* Chou, M.I.M, 17:30458
Huggins, F.E., *See* Chou, M.I.M, 17:30458
Hughes, *See* Jardin, S.C., 17:32403
Hughes, R.E., *See* Chou, M.I.M, 17:30458
Hughey, C.E., *See* Parks, M.B., 17:31018
Hull, D.R., Use of AC suspension magnets for Maglev propulsion and levitation, 17:31177 (RA;US)
Hull, J.R., Maglev system concept using 20-K high-temperature superconductors, 17:31165 (RA;US)
Hulse, R., *See* Allen, S.L., 17:32474
Hulsey, S.S., *See* Kong, F.M., 17:31280
See Pekala, R.W., 17:31282
Hultmark, G., *See* Sahlqvist, L., 17:30831
Hungerford, E.V., *See* Mayes, B.W., 17:32155
Hunt, R.N., *See* Farmer, F.G., 17:30759
Hunteiaar, M.E., The standard molar enthalpies of formation of $BaSiO_3$(s) and Ba_2SiO_4(s), 17:30960 (R;NL)
Hunteman, W.J., Safeguards technology and computer security training, 17:30770 (R;US)
Hunter, V.L., *See* Triplett, M.B., 17:30712
Huo Yuping, *See* Zhang Cheng, 17:32398
Huson, F.R., Magnet research required for Maglev, 17:31169 (RA;US)
Hussein, H.A., Control of radiation hazards in uranium exploration, 17:30612 (IA;CA)
Hussein, M.T., Hadron nucleon interactions in view of a multiperipheral model, 17:32157 (R;XA)
Hutchins, J.A., *See* Chen, H.Y., 17:32564
Hutton, A., Designing reliability into accelerators, 17:31442 (R;US)
See Bulos, F., 17:31522
Hwang, S.T., Mitochondrial and sarcolemmal membrane potentials determine accumulation of the R and S stereoisomers of the technetium isonitrile complex $Tc(CNCH(CH_2CH_3)CH_2OCH_3)_6^+$, 17:31822 (RA;US)
Hwang, W.G., *See* Handly, B., 17:32532
Hyder, M.L., *See* Allison, D.K., 17:31035, 17:31037
Hyndman, D.A., *See* Nelson, L.S., 17:31029
Hyvoenen, A., *See* Haenninen, P., 17:30497, 17:30510, 17:30516

I

Iacono, R., *See* Jardin, S.C., 17:32403
Ibe, E., *See* Karasawa, H., 17:31326
Ida, H., Design of the JLC positron source, 17:31502 (RA;JP;In Japanese)
Ighezou, F.Z., *See* Ngo, H., 17:32258
Ignat, D.W., *See* Jardin, S.C., 17:32403
Ignatenko, M.A., *See* Azhgirej, L.S., 17:32330
Ignatova, L.G., *See* Zhabitskij, V.M., 17:31535
Iguchi, Tetsuo, *See* Nakazawa, Masaharu, 17:32320
Ihren, N., *See* Warnquist, B., 17:31139
Iida, Toshiyuki, *See* Kawade, Kiyoshi, 17:32321
Iijima, S., *See* Fu, C.Y., 17:32284
Ikeda, Yujior, *See* Nakazawa, Masaharu, 17:32320
Il'in, I.V., *See* Amirkhanov, I.V., 17:32051
Il'in, V.D., *See* Amirkhanov, I.V., 17:32051
Ilgner, R.H., *See* Jenkins, R.A., 17:31642
Indacochea, E., *See* Kucera, G.H., 17:31078
Ingalls, W.B., *See* Johnson, K.F., 17:31512, 17:31513
Ingram, E.M., *See* Bohrman, D.E., 17:30753
Iodice, O., *See* Canellas, C.O., 17:31843
Iofa, M.Z., *See* Demichev, A.P., 17:32098
Ipatti, A., Deformation stresses and mechanical behaviour of engineered barriers in the repository environment, 17:30750 (R;FI;In Finnish)
Ippolito, D., *See* Bassignani, A., 17:30626
Irick, S.C., Using a straightness reference in obtaining more accurate surface profiles from a Long Trace Profiler, 17:31516 (R;US)
Isaev, A.P., *See* Filippov, A.T., 17:32108
Ishigure, K., *See* Shiraishi, H., 17:31327
Ishii, Mamoru, *See* Leung, Waihung, 17:31387
Ishii, Yoshihiko, *See* Leung, Waihung, 17:31387
Ishijima, Kiyomi, *See* Homma, Kozo, 17:30953
Ishiwatari, N., *See* Naritomi, M., 17:31336
Ishiwatari, Nasumi, Aqueous solution of iodide under gamma ray irradiation: Fixation of iodide by adding soluble silver salt, 17:31335 (RA;JP)
Isitman, A.T., *See* Ozker, K., 17:31781
Isler, R.C., *See* Uckan, T., 17:32404, 17:32433
Isosaari, K., *See* Pirhonen, V., 17:30751
Issar, A., Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee, 17:31712 (IA;IL)
Iseler, D., Chiral corrections to the anomalous 2γ decays of π^0, η and η', 17:32182 (R;US)
Itano, A., *See* Kanazawa, M., 17:31498
Ito, Mitsuo, *See* Kobayashi, Fumiaki, 17:30991
Ivalo, L., Report on the enforcement of the air pollution control act in the province of central Finland. Part 2: Development trends in pollutant emissions and air quality, pollution control costs, 17:31069 (R;FI;In Finnish)
Ivanenok, J. III, *See* Cooper, M.H., 17:30537
Ivanov, I.N., *See* Zhabitskij, V.M., 17:31535, 17:31536
Ivanov, Y.B., Relativistic mean-field three-fluid model for intermediate-energy heavy-ion collisions. Simulation of kinetic results, 17:32304 (IA;DE)
Ivashkevich, A.A., Boiling crisis in water forced flow in tubes, 17:31391 (R;SU;In Russian)
Boundary void fraction in water flow in tubes, 17:31393 (R;SU;In Russian)
Ivashkevich, S.A., Hall-effect device of high accuracy, 17:31619 (R;SU;In Russian)
Iwai, S., *See* Momose, T., 17:31583
Iwamoto, Osamu, *See* Koori, Norihiko, 17:32322
Iwasaki, Shin, *See* Nakazawa, Masaharu, 17:32320
Iwashina, T., *See* Wiebe, L.I., 17:31785
Iyer, N.C., *See* Thomas, J.K., 17:30963, 17:31036
Izmajlov, D.M., New type of radiation aftereffect: study of life span in generations of irradiated drosophila, 17:31976 (RA;SU;In Russian)

J

Jackson, D.D., *See* Rogers, Y.C., 17:31305
Jackson, H.E., A short-orbit spectrometer for Hall C, 17:31471 (R;US)
Jackson, J., *See* Priestley, K., 17:32017
Jackson, R., *See* Tsinontides, S.C., 17:30541
Jacobs, G., *See* Solomon, A.D., 17:31042
Jacobs, W.W., *See* Arvieux, J., 17:32153, 17:32154
Jacobsen, E.W., Studies on dynamics and control of distillation columns, 17:31138 (I;NO)
Jacobsen, T., *See* Danielsen, K.M., 17:32179
Jacobson, A.R., *See* Carlos, R.C., 17:32052
Jacobsson, L., *See* Vestergren, E., 17:31904
Jacquot, C., *See* Pamela, J., 17:32442, 17:32443
Jaeger, A., *See* Villegier, J.C., 17:31251
Jahnke, R.A., The flux and recycling of bioactive substances in the surface sediments of the deep basins off southern California: Final report, 17:31695 (R;US)
James, A.C., *See* Dixon, D.W., 17:31719
James, B.A., *See* Hoekstra, P., 17:30561
Jamet, P., Coupled processes in the near-field, 17:30729 (RA;SE)
Jammet, H., The consequences of the latest ICRP recommendations on a revision of Publication 24, 17:30620 (IA;CA)
Jang, Ping-Rey, *See* Phillip, T., 17:31076
Janoki, Gy.A., Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts, 17:31804 (RA;US)
See Barbarics, E., 17:31824
Janos, A.C., *See* Nagayama, Y., 17:32434
Janot, P., Testing the neutral Higgs sector of the M.S.S.M. with a 300-500 GeV e^+e^- collider, 17:32147 (R;FR)
Janssens, R.V.F., *See* Daly, P.J., 17:32272
See Grabowski, Z.W., 17:32240
Jansson, L., Urban ecological initiatives, 17:31056 (I;DK;In Danish)

Jansson, M., Wetlands and lakes as nitrogen traps: Research programme for the period 1 July 1990 - 30 June 1994, 17:31758 (R;SE)
Jantzen, C.M., *See* Andrews, M.K., 17:30743
Jardin, S.C., Theoretical basis for advanced plasma configurations, 17:32403 (R;US)
Jaszczak, R.J., SPECT assay of radiolabeled monoclonal antibodies: Third yearly progress report, September 1991–February 1992, 17:31777 (R;US)
SPECT assay of radiolabeled monoclonal antibodies: Comprehensive progress report, September 1989–February 1992, 17:31778 (R;US)
Jeandey, C., *See* Duret, D., 17:31289
Jeng, K.T., The radiation protection experience in KSNP of Taiwan during the past decade, 17:31991 (RA;US)
Jenkins, H., *See* Vaughan, N., 17:30826
Jenkins, J.T., Rapid granular shear flows driven by identical, bumpy, frictionless boundaries, 17:30525 (RA;US)
Jenkins, M.L., Experimental studies of cascade phenomena in metals, 17:31203 (R;US)
See King, S.L., 17:31200
Jenkins, R.A., Protocol for determination of chemical warfare agent simulant movement through porous media, 17:31642 (R;US)
Jenkins, R.T., SAGEWASP: Optimal electric utility expansion, 17:32524 (CM;US)
Jennings, T.L. Jr., Ingot homogenization, 17:31217 (R;US)
Jensen, B., General relativistic model of a spinning cosmic string, 17:32126 (R;NO)
Jensen, H.F., *See* Hauff, T.W., 17:30990
Jensen, O., *See* Abel, E., 17:31107
Jeong, J.M., *See* Kinuya, S., 17:31806
Jequier, F., *See* Pamela, J., 17:32444
Jernigan, T.C., *See* Uckan, T., 17:32404, 17:32433
Jesson, D.E., Atomistic processes of surface segregation during Si-Ge MBE growth, 17:31268 (R;US)
Ji Changsong, Improved thomas formula for radon measurement, 17:31644 (R;CN;In Chinese)
Ji Linzhen, *See* He Cexi, 17:31859
Ji, H., *See* Prager, S.C., 17:32412
Jia Guozhen, *See* Huang Yucai, 17:31606
Jiang Ji, *See* Zhu Shoupeng, 17:31854
Jiang Shengyao, *See* Wu Shaorong, 17:31380
Jiang Youming, *See* Yang Zhenhua, 17:31483
Jikia, G.V., Single t-quark production in high energy γe collisions, 17:32158 (R;SU)
Jin, J.Z., *See* Premuzic, E.T., 17:30853
Jobe, D.J., *See* Kupferschmidt, W.C.H., 17:31339
Johansen, B., Marine geophysical studies in the Northern Atlantic with emphasis on sedimentation, crustal structure and subsidence, 17:30565 (I;NO)
Johansson, J., *See* Vapaavuori, O., 17:30553
Johansson, L., Dosimetry of intrathecally administered radiopharmaceuticals, 17:31887 (RA;US)
Effective dose to the patient from radiopharmaceuticals calculated with the new ICRP tissue weighting factors, 17:31880 (RA;US)
See Vestergren, E., 17:31904
Johansson, Sam, SAS Froesundavik. An office heated and cooled by groundwater, 17:31092 (R;SE)
Johnsen, R., *See* Yuh, C.Y., 17:31084
Johnson, A.B. Jr., *See* Buckley, G.D., 17:30962
Johnson, A.J., Reviews of computing technology: Fiber distributed data interface: Revision, 17:32568 (R;US)
Johnson, B.N., *See* Morlet, M., 17:32314
Johnson, H.R., *See* Overbey, W.K., 17:30588
Johnson, J.R., *See* Myers, D.K., 17:31940
Johnson, K.F., Commissioning of the Ground Test Accelerator RFQ, 17:31512 (R;US)
Commissioning of the Ground Test Accelerator Intertank Matching Section, 17:31513 (R;US)
Johnson, N.F., *See* Brooks, A.L., 17:31997
Johnson, N.R., *See* Lee, I.Y., 17:32243
Johnson, R.H., PROGLOOK: User program performance monitor, 17:32540 (CM;US)
Johnson, T.R., *See* Chow, L.S., 17:30654
Jokioinen, I., Energy savings with combination dryer, 17:31136 (R;FI;In Finnish)
Jolly, J.E., *See* Bailey, M., 17:30689
Jolos, R.V., *See* Antonenko, N.V., 17:32328
Jonah, D.A., Chemical potentials in dilute, multicomponent solutions, 17:31311 (R;US)
Jonassen, N., Electrical properties of radon daughters, 17:31656 (IA;CA)
Jones, A.G., *See* Barbarics, E., 17:31824
See Verdera, S., 17:31823
Jones, B.G., Characterization of jet breakup mechanisms observed from simulant experiments of molten fuel penetrating coolant: Technical progress report, FY 1992, 17:31005 (R;US)
Jones, J.L., *See* Farmer, F.G., 17:30759
Jones, J.L. Jr., *See* Anderson, M.T., 17:31010
Jones, K.W., *See* Paschoa, A.S., 17:31951
Jones, M.T., The efficient parallel iterative solution of large sparse linear systems, 17:32503 (R;US)
See Canfield, T.R., 17:31265
Jones, P., *See* Vaughan, N., 17:30826
Jong, C.T.J., Structural analyses of ITER toroidal field coils under fault conditions, 17:32454 (R;NL)
Jong, R.A., DIII-D edge physics database, 17:32475 (R;US)
Jordan, H.E., *See* Dykhuizen, R.C., 17:32392
Jordan, P.J., *See* Shapiro, C., 17:30663
Joret, H., *See* Benguerba, M., 17:32377
Josefsson, W., Measurements of total ozone, 17:31671 (R;SE)
Joseph, D.D., *See* Fortes, A.F., 17:30540
Joshi, P.K., *See* Mantica, P.F., 17:32245
Jouan, D., Dynamics and thermalization in violent collisions between ^{40}Ar and Ag at 27 MeV/nucleon, 17:32313 (R;FR)
Jourdan, F., *See* Morlet, M., 17:32314
Jourdan, J., Nucleon form factors, 17:32260 (RA;FR)
Joy, D.S., *See* Jenkins, R.T., 17:32524
Ju Shixiao, *See* Tian Jian, 17:30884
Jungclas, H., *See* Psarros, N., 17:30641
Juraev, O.M., *See* Amirkhanov, I.V., 17:32145
Juul Rasmussen, J., Optics and Fluid Dynamics Department. Annual progress report 1 January - 31 December 1991, 17:32499 (R;DK)

K

Kadambi, J.R., *See* Wildman, D.J., 17:30521
Kaempfer, B., Dilepton radiation from partially equilibrated parton matter, 17:32141 (IA;DE)
Small angle correlations of intermediate mass fragments in reactions Au + Au at E/A = 100, 150, 250 MeV, 17:32292 (IA;DE)
Kainulainen, K., *See* Altherr, T., 17:32199
Kakihara, Kazuhisa, *See* Kamitani, Takuya, 17:31538
Kalau, Wolfgang, On Gupta-Bleuler quantization of systems with second-class constraints, 17:32123 (R;NL)
Kalinichenko, V.V., *See* Akhmanov, V.V., 17:31492
See Batmanova, Eh.G., 17:31618
Kallio, S., A comparison of numerical procedures for calculation of steady two- and three-dimensional two-phase flow, 17:31373 (R;FI)
A dimensional model for char combustion in a circulating fluidized bed, 17:30539 (R;FI)
Kallner, P., System study, wood powder heat 30 kW - 3 MW, 17:30810 (R;SE;In Swedish)
Kalmbach, U., Dynamical simulation of quark systems within a covariant transport approach, 17:32160 (IA;DE)
Kamalov, S.S., *See* Chumbalov, A.A., 17:32326
Kameari, Akihisa, *See* Azumi, Masafumi, 17:32460
Kamel, A.M., *See* Wilbanks, T.J., 17:31049
Kaminski, P., *See* Arvieu, R., 17:32020
Kamitani, Takuya, A simulation study on KEK positron generator, 17:31538 (RA;JP;In Japanese)
Kammerer, B., *See* Stuka, B., 17:31234
Kamp, H.A.J. van der, *See* Uhl, M., 17:32282
Kamran, M., Weak probes and the Gottfried sum rule, 17:32134 (R;XA)

Kanazawa, M., Beam monitors for rf feedback control in HIMAC synchrotron, 17:31498 (RA;JP)
Kane, R.J., *See* Cummins, W.F., 17:31629
Kanehara, K., *See* Yamaguchi, Y., 17:30833
Kang Rixin, *See* Chen Dianshan, 17:30881
Kang, M., *See* Rosocha, L.A., 17:31662
Kania, D.R., *See* Kilkenny, J.D., 17:32478
Kantidis, E., *See* Marini, B., 17:31209
Kapadvanjwala, M., *See* Dewanjee, M.K., 17:31821, 17:31839, 17:31840, 17:31841, 17:31842, 17:31913, 17:31921
Kaplan, P.G., *See* Barnard, R.W., 17:30719
Kappel, G., *See* Glaeb, F., 17:30696
Kaptari, L.P., Gottfried sum rule and mesonic exchanges in deuteron, 17:32112 (R;SU)
Kapuscik, E., On classical electrodynamics with distribution-valued sources, 17:32110 (R;SU)
Karapetian, G.V., *See* Adamian, F.V., 17:32310
Karapetian, V.V., *See* Adamian, F.V., 17:32310
Karasawa, H., Effect of boiling upon radiolysis of iodide solution, 17:31326 (RA;JP)
Kareoja, A., *See* Nyyssoelae, H., 17:31137
Karlsson, B., *See* Halleroed, P., 17:30860
Karlsson, Fred, *See* Allard, B., 17:31755
Karlsson, T.B., *See* Oehman, G.A., 17:31376
Karnland, O., *See* Pusch, R., 17:30733, 17:31738
Karpukhin, V.V., *See* Afanas'ev, L.G., 17:31568
Kartavtsev, O.I., *See* Belyaev, V.B., 17:32034
Kartavtsev, V.I., *See* Belyaev, V.B., 17:32035
Kasai, Noboru, Construction and operating performance of apparatus for rotating irradiation fiber curing, 17:30790 (R;JP;In Japanese)
Kase, T., Treatment of (γ, n) reaction by EGS4 code and connection to MCNP code, 17:32337 (RA;JP;In Japanese)
Kashimoto, Hironori, *See* Koori, Norihiko, 17:32322
Kasi, L.P., Evaluation of multiple-dose ^{153}Sm-EDTMP for bone pain palliation in cancer patients, 17:31787 (RA;US)
Kassis, A.I., *See* Mariani, G., 17:31817
Kassner, M.E., *See* Rosen, R.S., 17:31244
Kassner, T.F., *See* Park, J.Y., 17:30653
Katanishi, Shoji, *See* Yanagisawa, Kazuaki, 17:30896
Kate, H.H.J. ten, *See* Emden, W. van, 17:31519
Katoh, Kazuo, *See* Takahashi, Tomoyuki, 17:30702
Katoh, Toshio, *See* Kawade, Kiyoshi, 17:32321
Katz, A., *See* Herut, B., 17:31704, 17:31705
Kauffman, R., *See* Barnett, R.M., 17:32152
Kauffman, R.L., *See* Kilkenny, J.D., 17:32478
Kaufman, A., *See* Gardosh, M., 17:31702
Kauppi, P., *See* Anttila, P., 17:31683
Kawabata, S., *See* Ida, H., 17:31502
  See Miyamoto, A., 17:31500
Kawade, Kiyoshi, Measurement of formation cross sections of short-lived nuclei by 14 MeV neutrons–F, Mg, Si, Ti, Cr, Ni, Ga, Rb, Sr, Ag, 17:32321 (R;JP)
Kaye, J.H., *See* Maiti, T.C., 17:30714
Kazakova, G.G., *See* Akhmanov, V.V., 17:31492
  See Batmanova, Eh.G., 17:31618
  See Belyaev, A.L., 17:31434
  See Ivashkevich, S.A., 17:31619
Kazir, A., *See* Margaliot, M., 17:31650
Keane, D., Heavy-ion collisions and the nuclear equation of state: Progress report, August 15, 1991–March 1992, 17:32281 (R;US)
Kelling, C., The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
Keinigs, R.K., Tandem betatron, 17:31439 (PA;US)
Keller, G., Radioecological aspects of former mining activities in the Saxon Erzgebirge, 17:31716 (IA;AT)
Kelley, H.M., Project 8980: Fluorophotometers for laboratory services, 17:31357 (R;US)
Kelly, M., *See* Holt, J.B., 17:31261
Kemp, F.S., *See* Scheffler, G.W., 17:31082
Kempf, C.R., *See* Bieber, A.M. Jr., 17:31196
Kempka, S.N., *See* Dykhuizen, R.C., 17:32392
Kennett, R., *See* Shier, W., 17:30999
Kennett, R.J., *See* Chan, B.C., 17:30911
  See Horak, W.C., 17:30998
Kenney, W.J., *See* Lubell, M.S., 17:31171
Kercher, J.R., A computer simulation of ecosystem processes in forests for application to air pollution, acid precipitation and global change, 17:31674 (R;US)
Kersteins, D., *See* Johnson, K.F., 17:31513
Kessel, C., *See* Jardin, S.C., 17:32403
Ketema, D.J., Neutron metrology in the HFR: Steel irradiation R139-587/588/589, 17:31226 (R;NL)
Key, C.R., *See* Samet, J.M., 17:31939
Key, K.T., *See* Codell, R.B., 17:32546
Keyvani, M., Operating characteristics of rotating beds: Technical progress report for the third quarter 1988, 17:31297 (R;US)
Khalili-Varasteh, M., *See* Bottlaender, M., 17:31798
  See Brouillet, E., 17:31799
  See Maziere, B., 17:31797
Khan, A., Mine tests of a passive electret dosimeter for radon/thoron daughters, 17:31561 (IA;CA)
Khandogina, E.K., Cytogenetics of radiation-induced adaptation in man lymphocytes, 17:31973 (RA;SU;In Russian)
Khare, A., Perturbative ground state energy of three anyons in a harmonic potential, 17:32100 (R;FR)
Khazins, D.M., Electrical transparency of grids used in gaseous particle detectors, 17:31571 (RA;SU)
Khoa, D.T., Thermal properties and medium effects in the study of heavy-ion collisions with realistic NN interactions, 17:32294 (IA;DE)
  See Huang, S.W., 17:32303
  See Lehmann, E., 17:32305
  See Puri, R.K., 17:32307
Khoo, T.L., *See* Daly, P.J., 17:32272
  See Grabowski, Z.W., 17:32240
Khoromskij, B.N., *See* Zhidkov, E.P., 17:31617
Khristova, P.Kh., *See* Bardin, D.Yu., 17:32146
Khryashchev, O.A., *See* Gorban', L.M., 17:31392
Kibler, M., On quantum groups and their potential use in mathematical chemistry, 17:32043 (R;FR)
Kido, C., *See* Anderson, M.T., 17:31010
Kiggans, J.O. Jr., *See* Tiegs, T.N., 17:31254
Kilde, N., *See* Schleisner, L., 17:31149
Kilkenny, J.D., Recent Nova experimental results, 17:32478 (R;US)
Killmeyer, R.P., *See* Klima, M.S., 17:30427
Killough, S.M., *See* Burks, B.L., 17:31355
Kim, E.E., *See* Kasi, L.P., 17:31787
Kim, H.J., *See* Toth, K.S., 17:32244
Kim, Hyoun-Ee, Cesium iodide alloys, 17:31613 (PA;US)
Kimmitt, R.R., *See* Gates, D.D., 17:30754
Kimura, Hideo, *See* Takahashi, Tomoyuki, 17:30702
King, H.L., *See* Haase, C.S., 17:30745
King, R.H., *See* Briggs, M.R., 17:31555
King, S.L., Weak-beam imaging of dissociated dislocations in HVEM-irradiated Fe-Ni-Cr alloys, 17:31200 (R;US)
Kinuya, S., Effect of DTPA molecules conjugated to lysine residues on metabolism of I-125 and Tc-99m labeled T101, 17:31806 (RA;US)
Kirchbach, M., Chiral symmetry in particle physics and its manifest realization in terms of parity doublets, 17:32094 (IA;DE)
Kirk, M.A., *See* Jenkins, M.L., 17:31203
  See King, S.L., 17:31200
  See Smalinskas, K., 17:31202
  See Vetrano, J.S., 17:31201
Kirsch, W.M., *See* Cheng, K.T., 17:31836
Kirsteins, L., *See* Ho, C., 17:32003
Kirvel, R.D., *See* Anderson, S.E., 17:31285
Kishimoto, Y., *See* Kase, T., 17:32337
Kishinami, R.I., Methodological aspects of market study on residential, commercial and industrial sectors, of the Conversion Project for natural gas of existing network in Sao Paulo city, 17:30596 (IA;BR;In Portuguese)
Kispert, L.D., *See* Sady, W., 17:30461
Kitamura, Takashi, *See* Nakatsuka, Takao, 17:31581
Kitchin, R.M., *See* Brooks, A.L., 17:31997

Kiukaanniemi, E., Measurements, classification and valorization of environmental problems: Case rural area of Oulu, 17:31667 (R;FI;In Finnish)
Kivelson, S.A., *See* Emery, V.J., 17:31248
Kiyan, I.N., *See* Belyaev, A.L., 17:31434
Klaisner, L., *See* Briggs, D., 17:31497
Klarer, P.R., *See* Purvis, J.W., 17:31365
Klarsfeld, S., Magnus approximation in the adiabatic picture, 17:32025 (R;FR)
Klein, F., *See* Andresen, H., 17:32261
Klein, S., *See* Barnett, R.M., 17:32152
Kleinert, K.P., Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)
Kleinstreuer, C., Analysis of transport mechanisms in dense fuel droplet sprays: Final report, 17:31344 (R;US)
Klemm, A.D., *See* Fabre de la Ripelle, M., 17:32193
Klickman, A.E., CURIE: Fission product inventory decay history, 17:32537 (CM;US)
Klier, K., Binding and catalytic reduction of NO by transition metal aluminosilicates: Technical progress report, March 1992–May 1992, 17:30483 (R;US)
Klima, M.S., Performance evaluation of micronized-magnetite cycloning at high relative densities of separation, 17:30427 (R;US)
Klinzing, G.E., *See* Cooper, M.H., 17:30537
Klipper, R., *See* Phillips, W.T., 17:31815
Klosterbuer, S.F., *See* Sprinkle, J.K. Jr., 17:30760
Knapp, R.B., *See* Wijensinghe, A.M., 17:30734
Kneuer, J.B., *See* Williams, D.F., 17:31330
Knaus, E.E., *See* Wiebe, L.I., 17:31785
Knauss, H., *See* Stuka, B., 17:31234
Knight, R.A., The MAGSORB process for bulk separation of carbon dioxide: Final report, 17:31296 (R;US)
Knudsen, G., Thermal balance and operational aspects of 3 hour lock-outs at 37 bar during a simulated dive, 17:31410 (R;NO)
Knutsson, B., Pilot plant for sealed gas-storage facility at Graengesberg (Sweden), 17:30598 (R;SE;In Swedish)
Knystautas, R., *See* Papavassiliou, J., 17:31158
Kobayashi, Fumiaki, An examination on the determination precision of uranium content in the HTGR fuel compacts, 17:30991 (R;JP;In Japanese)
Kobayashi, Katsuhei, *See* Nakazawa, Masaharu, 17:32320
Kobayashi, Takashi, *See* Kawade, Kiyoshi, 17:32321
Koch, J.A., Experimental studies of x-ray laser spectral profiles: Observation of gain narrowing and saturation behavior, 17:31426 (R;US)
Koch, P., Finite positive pion chemical potential and lepton pair production in heavy ion collisions, 17:32300 (IA;DE)
Kochkin, O.I., *See* Belyaev, V.B., 17:32034
Kochkin, V.A., *See* Glazov, A.A., 17:31436
Kochkin, V.I., *See* Belyaev, V.B., 17:32035
Kocks, U.F., Is there a unique effective interaction profile for dislocations?, 17:31235 (R;US)
Koczon, P., *See* Senger, P., 17:32296
Koehler, S., Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
Koenig, A., *See* Taibi, I., 17:31347
Koganty, K.R., *See* Qi, P., 17:31833
Kohsaka, Atsuo, *See* Watanabe, Tadashi, 17:31394
Koivisto, M., *See* Korpijaakko, M., 17:30493, 17:30503
Kokkins, S.J., Sustained passenger G-loads in Maglev: Needs and payoffs, 17:31183 (RA;US)
Kolehmainen, P., *See* Raemoe, T., 17:31074
Kolodny, Y., *See* Summer, N.S., 17:31708
  See Tzur, D., 17:31709
  See Vangosh, A., 17:31706
  See Vengosh, A., 17:31715
Kolsrud, M., Maximal reductions in the Baker-Hausdorff formula, 17:32044 (R;NO)
Komarov, V.I., *See* Afanas'ev, L.G., 17:31568
Komawazawa, M., Compilation of a gravity map on 1/500,000 Niigata sheet, 17:32009 (IA;JP;In Japanese)
Komazawa, M., *See* Takahashi, M., 17:30836
Komochkov, M.M., Double differential neutron and proton productions cross sections in nucleus-nucleus collisions, 17:32335 (R;SU;In Russian)
Komova, O.V., Induction of SOS-system in E.Coli under γ-irradiation in the presence of anoxic sensitizer TAN, 17:31964 (RA;SU;In Russian)
Kompe, R., Measurements of radon and decay products in non-uranium mines of the Federal Republic of Germany using active and passive methods, 17:31654 (IA;CA)
Konashi, K., *See* Kase, T., 17:32337
Kondo, S., Overview of severe accident research in Japan, 17:31012 (RA;JP)
Kondo, Y., *See* Yamamoto, a., 17:31400
Kondrat'ev, V.P., *See* Golokhvastov, A.I., 17:31575
Kong, F.M., Determination of the permeability of carbon aerogels by gas flow measurements, 17:31280 (R;US)
  See Pekala, R.W., 17:31282
Konings, R.J.M., Infrared spectra of the gaseous iodides of chromium, iron and nickel, 17:31227 (R;NL)
Koo, Sang-Man, Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of $Ru_3(CO)_{12}$ (or $RuCl_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)
  See Hoppe, M.L., 17:30428
Koori, Norihiko, Polarized proton induced breakup of ^{12}C at 16 MeV, 17:32322 (R;JP)
Kopasz, J.P., *See* Billone, M.C., 17:32438
Kopecky, J., European Activation File for fusion: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32216 (R;NL)
  See Betak, E., 17:32283
  See Fu, C.Y., 17:32284
  See Uhl, M., 17:32217, 17:32282
Kopeikin, I.N., Anticipated radiation environmental effect from the Moscow Kaon Factory, 17:30966 (RA;US)
Kopeliovich, B.Z., Hadronization of highly virtual quarks in nuclei, 17:32233 (R;SU)
  Quantum effects and colour transparency in charmonium photoproduction on nuclei, 17:32324 (R;SU)
Koprijaakko, M., The peat resources of seventeen peat deposits in the commune of Kannonkoski in Central Finland, 17:30514 (R;FI;In Finnish)
Korchemskij, G.P., Parasupersymmetric spinning particle and topological gauge fields, 17:32105 (R;SU)
Korenev, I.L., *See* Zhabitskij, V.M., 17:31458, 17:31536
Korenowski, G.M., Noninvasive probing of the ocean surface using laser-based nonlinear optical methods, 17:32015 (R;US)
Kornblum, H.N., *See* Kilkenny, J.D., 17:32478
Koroesi, L., *See* Janoki, Gy.A., 17:31804
Koroll, G.W., *See* Kupferschmidt, W.C.H., 17:31340
Korovin, P.P., *See* Gareev, F.A., 17:32256
Korpa, C.L., The meson contribution to semi-inclusive deep inelastic scattering with slow protons in the final state, 17:32161 (IA;DE)
Korpijaakko, M., The peat resources of seven peat deposits in the commune of Lestijaervi in Western Finland, 17:30493 (R;FI;In Finnish)
  The peat resources of seventeen peat deposits in the commune of Reisjaervi in Western Finland, 17:30503 (R;FI;In Finnish)
Korth, G.E., *See* Rabin, B.H., 17:31276
Korzekwa, D.R., Experimentation and simulation of gravity fed lead castings, 17:31236 (R;US)
Kosarev, I.G., The system of standard currents, 17:31493 (R;SU;In Russian)
Koshizuka, N., *See* Gotoh, S., 17:31259
Koskinen, H., Reaction kinetics of coal combustion: A literature review, 17:30538 (R;FI)
  See Kallio, S., 17:30539
  See Oehman, G.A., 17:31376
Kostroun, V.O., Experimental study of interactions of highly charged ions with atoms at keV energies: Progress report, July 1, 1991–June 30, 1992, 17:32357 (R;US)
Kotte, R., *See* Kaempfer, B., 17:32292

Koudela, K., Effect of durable γ-radiation on E.Coli, 17:31963 (RA;SU;In Russian)
Kouzes, R.T., Fourier transform ion cyclotron resonance precision atomic mass measurement limits, 17:31620 (R;US)
Kovac, F.M., Uranium hexafluoride (UF_6) and 21 PF-1 overpack: Proposed rulemaking revisions, 17:30644 (R;US)
Kovacik, M., 4th international school of nondestructive testing, 17:31403 (I;CS;In Czech, Slovak)
Kovalenko, A.D., Calculations of a two-dimensional pulsed magnetic field of an emulsion detector coil by the combined method, 17:31574 (R;SU;In Russian)
See Tsambel, V., 17:31459
Kovscek, A.R., A pore-level scenario for the development of mixed-wettability in oil reservoirs, 17:30571 (R;US)
Kowalczyk, R.S., *See* Jackson, H.E., 17:31471
Kox, S., *See* Bocquet, J.P., 17:32312
Kozanecki, W., *See* Furman, M., 17:31465
Kozhuharov, C., *See* Bernas, M., 17:32228
Kozier, G., Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report, 17:30589 (R;US)
Kozubek, S., *See* Basha, S.G., 17:31961, 17:31962, 17:31982
See Komova, O.V., 17:31964
Krall, N.A., Annual performance report for "A program of FRC theory research", 17:32448 (R;US)
Kramer, D.P., *See* Munger, A.C., 17:31633
See Woods, C.M., 17:31632
Krasavin, E.A., *See* Basha, S.G., 17:31961, 17:31962, 17:31982
See Govorun, R.D., 17:31968
See Komova, O.V., 17:31964
Krasnow, A.Z., *See* Ozker, K., 17:31781
Krasny, M.W., *See* Whitlow, L.W., 17:32183
Krass, A.W., *See* Mihalczo, J.T., 17:31352
Kratzer, M., *See* Scheinman, L., 17:31197
Krauskopf, J., *See* Bethge, K., 17:31298, 17:31299
Krauss, A., *See* Nygren, R.E., 17:32470
Krejcik, P., A simple model for SLC positron stability issues, 17:31464 (R;US)
Kremer, C., *See* Leon, A., 17:31818
Kresin, V.V., Analysis of collective resonances in clusters: Metals and carbon, 17:32367 (R;US)
Kress, T.S., *See* Weber, C.F., 17:30874
Kreutz, P., *See* Mueller, W.F.J., 17:32291
Krick, M.S., *See* Langner, D.F., 17:30771
Krier, H., *See* Buckius, R.O., 17:30551
Krikorian, O.H., Evaluation of actinide volatilities in mixed waste processors, 17:30735 (R;US)
Krishnan, G., Visualization of the wall-slip layer in bounded flows of suspensions, 17:30522 (RA;US)
Kristensen, L., The cup anemometer and other exciting instruments, 17:30861 (R;DK)
Kristofzski, J.G., Plutonium finishing plant comparison with 40 CFR 61, subpart H, and other referenced guidelines for stack 291-Z-1, 17:30757 (R;US)
Kroeger, P.G., Safety aspects of forced flow cooldown transients in modular high temperature gas-cooled reactors, 17:31002 (R;US)
Kronauge, J.F., *See* Barbarics, E., 17:31824
See Hwang, S.T., 17:31822
See Verdera, S., 17:31823
Kronberg, J.W., Random one-of-N selector, 17:30773 (PA;US)
Solid state safety jumper cables, 17:31150 (PA;US)
Krug, H.E.P., LEOPARDSPOTS: Spectrum calc with depletion, 17:32534 (CM;US)
Kruijf, W.J.M. de, A shortcoming of NITAWL/BONAMI causing problems in KENO calculations, 17:32516 (R;NL)
Krumpelt, M., *See* Kumar, R., 17:31188
Krupa, D., *See* Meshcheryakov, V.A., 17:32166
Kruse, C.W., *See* Chou, M.I.M, 17:30458
Kryachko, A.P., *See* Buchnev, V.N., 17:31956
Krylov, A.R., Neutron spectra in the energy range from 10^{-8} to hundreds of MeV measurement in hard scattered radiation fields, 17:32347 (R;SU;In Russian)
Kryter, R.C., Aging and service wear of solenoid-operated valves used in safety systems of nuclear power plants: Volume 2, Evaluation of monitoring methods, 17:30947 (R;US)
Kucera, G.H., ANL's research and development of alternative components for MCFC's, 17:31078 (R;US)
Kudryavtsev, M.E., *See* Kuropteva, Z.V., 17:31978
Kuehn, W., *See* Ostendorf, R., 17:32253
Kugler, A., Detection of neutrons by BAF_2 TAPS modules in relativistic heavy ion collisions, 17:31566 (IA;DE)
Kuikka, J.T., *See* Hiltunen, J.V., 17:31914
See Nikula, T.K., 17:31792
Kul'chitskij, Yu.A., *See* Vinogradov, V.B., 17:31577
Kulaga, J.E., *See* DeLuca, W.H., 17:31043
Kulkarni, P.V., *See* Goomer, N.C., 17:31780
Kumano, S., 'Local' EMC effects and the J/ψ suppression, 17:32221 (IA;DE)
Kumar, A.S., *See* Garner, F.A., 17:30948, 17:31237
Kumar, D., *See* McGlynn, S.P., 17:31760, 17:31761
Kumar, R., Reformers for the production of hydrogen from methanol and alternative fuels for fuel cell powered vehicles, 17:31188 (R;US)
Kunde, G.J., *See* Mueller, W.F.J., 17:32291
Kung, P.J., *See* McHenry, M.E., 17:32391
Kunne, R.A., Electroproduction of polarized Λ's, 17:32187 (R;FR)
Kuno, Y., *See* Nishida, K., 17:30772
Kupfer, K., *See* Litaudon, X., 17:32423
Kupferschmidt, W.C.H., Iodine chemistry in the presence of vinyl surfaces, 17:30944 (RA;JP)
The Advanced Containment Experiments (ACE) Radioiodine Test Facility experimental program, 17:31339 (RA;JP)
The effects of zinc primer surfaces on iodine behaviour within containment, 17:30943 (RA;JP)
The oxidation of cesium iodine aerosols during hydrogen combustion, 17:31340 (RA;JP)
Kuprin, A.P., *See* Kuz'min, R.N., 17:32427
Kurachenko, Yu.A., *See* Dubinin, A.A., 17:32344
Kuritsin, A.A., *See* Khazins, D.M., 17:31571
Kuroda, S., *See* Miyamoto, A., 17:31500
Kuroda, Toshimasa, *See* Murakami, Yoshiki, 17:32463
Kuroki, Tsugunari E., International Maglev technology center, 17:31163 (RA;US)
Kuropteva, Z.V., Modification of primary radiation injuries of biological systems by into compounds, 17:31978 (RA;SU;In Russian)
Kurtz, R.J., *See* Doctor, S.R., 17:31022
Kusaka, K., Scale and chiral symmetry breaking at finite density in the NJL model, 17:32093 (IA;DE)
Kusiak, R., *See* Muller, J., 17:31934
Kuusela, P., *See* Oehman, G.A., 17:31371
Kuz'min, R.N., Observation of fast neutrons and tritium during electrolysis of heavy water, 17:32427 (R;SU)
Kuz'min, V.A., Description of the Gamow-Teller β^+-decays and (n,p) transitions in spherical nuclei, 17:32250 (R;SU)
Kuznetsov, S., Active damping of Maglev vehicles using superconducting linear synchronous motors, 17:31176 (RA;US)
Kwast, H., Fabrication, properties and tritium release rates of lithium zirconates: Paper presented at the 'Third International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93rd Annual Meeting of the American Ceramic Society', Cincinnati, Ohio, April 28-May 2, 1991, 17:32452 (R;NL)
Kwei, G.H., *See* Lawson, A.C., 17:32041
Kwok, C.S., Enhancement of radiation dose to the bone marrow from backscattering of electron sources, 17:31894 (RA;US)

L

L, *See* Moir, R.W., 17:32471
La Cruz, R.M. de, *See* Moser, P., 17:32368
La Porta, J., *See* Brambley, M.R., 17:31117
Lacava, C., *See* Leon, A., 17:31818
Lachkar, J., *See* Andre, M., 17:32439
Ladd, A.J.C., Dynamical simulations of sedimentation, 17:30533 (RA;US)
Laensimies, E., *See* Hiltunen, J.V., 17:31914

See Nikula, T.K., 17:31792

Lafuma, J., *See* Chameaud, J., 17:31931

Laget, J.M., Spin correlations in photo- and electro-disintegration of the few-body systems, 17:32265 (RA;FR)

See Didelez, J.P., 17:32317

Lahiri, A., *See* Smith, T., 17:31773

Lai Dongxian, Theoretical study of aluminium-copper impedance matching targets for laser-high-pressure state equation, 17:31411 (R;CN;In Chinese)

Laine, R.M., *See* Hoppe, M.L., 17:30428

See Koo, Sang-Man, 17:30429

Lalies, A.A., *See* Creamer, S.C., 17:30690

Lambert, F., Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T, 17:31835 (RA;US)

Lambertson, G., *See* Briggs, D., 17:31497

Lampley, C.M., SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)

Lamy, D., *See* Bonne, A., 17:30687

Lan, M.D., Flux pinning in oxygen-depleted $YBa_2Cu_3O_{7-y}$ single crystals, 17:31264 (R;US)

Landabaso, A., *See* Colombo, R., 17:30820

Landen, O.L., *See* Kilkenny, J.D., 17:32478

Landesman, C., Extraction of molybdenum by the di-n-butyl 2.2.N.hydroxyhexanamide (tri-n-butylacetohydroxamic acid) from aqueous acidic media, 17:31290 (R;FR;In French)

Lane, S.M., *See* Kilkenny, J.D., 17:32478

Lang, A., *See* Maruyama, T., 17:32306

Lang, K., *See* Clapper-Gowdy, M., 17:31686

See Whitlow, L.W., 17:32183

Langdon, A.B., *See* Moir, R.W., 17:32471

Lange, R., Modeling the dispersion of tracer plumes in the Colorado front range boundary layer during night- and day-time conditions, 17:31678 (R;US)

See Rodean, H.C., 17:31677

Langevin-Joliot, H., *See* Morlet, M., 17:32314

Langner, D.F., The use of ring ratios to detect sample differences in passive neutron counting, 17:30771 (R;US)

Langner, D.G., Waste crate counter design, 17:30708 (R;US)

See Sprinkle, J.K. Jr., 17:30768

Lantto, B., On fluid power control. With special reference to multi-load conditions in load sensing systems, 17:31361 (R;SE)

Lanyon, G., *See* Herbert, A., 17:31743

Lapin, E.G., *See* Alekseev, V.L., 17:32380

Lapostolle, P., *See* Valero, S., 17:31452

Larin, A.A., *See* Tsambel, V., 17:31459

Larsen, E.D., *See* Taylor, P.L., 17:31358

Larsen, H., Systems Analysis Department. Annual progress report 1991, 17:31050 (R;DK)

Larsen, J.W., The effect of selective absorption on coal conversion, October–December 1991, 17:30456 (R;US)

Larsen, R.P., *See* Rimkus, W.A., 17:31189

Larsen, S.Y., *See* Fabre de la Ripelle, M., 17:32193, 17:32354

Larson, D.C., *See* Fu, C.Y., 17:32284

Larson, L.L., *See* Buckley, G.D., 17:30962

Larson, S.M., *See* Daghighian, F., 17:31902

Larson, T.K., *See* McEligot, D.M., 17:31388

Larsson, B., Heat insulated tube system for dairying environment, 17:31135 (R;SE)

Laster, L.M., *See* Gates, D.D., 17:30754

Lathrop, K.A., Distribution of ionic indium and gallium in pregnant and nonpregnant animals, 17:31885 (RA;US)

See Harper, P.V., 17:31899

See Hay, R.V., 17:31892

Lathrop, K.D., The early days of the S_n method, 17:32352 (R;US)

Lauf, R.J., Microwave sintering of multilayer ceramic capacitors, 17:31253 (R;US)

Laughlin, G.J., *See* Poeton, R.W., 17:32544

Launay, M., *See* Beaudoing, G., 17:30655, 17:30656

Lauritsen, T., *See* Daly, P.J., 17:32272

See Grabowski, Z.W., 17:32240

Lawrence, A.M., *See* Ho, C., 17:32003

Lawson, A.C., Measurement of atomic elastic constants by pulsed neutron powder diffraction, 17:32041 (R;US)

Lawson, R.D., ABAREX: A neutron spherical optical-statistical model code, 17:32271 (R;US)

Layne, A.W., *See* Zammerilli, A.M., 17:30590

Lazard, C., *See* Auger, J.P., 17:32163

Lazarov, L., *See* Larsen, J.W., 17:30456

Le Brun, C., *See* Stuttge, L., 17:32280

Le Goff, R., *See* Blanc, J.Y., 17:31205

Le Meur, G., Electronics around the accelerators- mathematical recalls, 17:31438 (R;FR;In French)

Le Pape, A., *See* Hoffschir, D., 17:31769

Le Shangcheng, *See* Zhu Shoupeng, 17:31857

Le, N., *See* Kinuya, S., 17:31806

Leasure, C.S., Characterization of radioactive mixed wastes: The industrial perspective, 17:30705 (R;US)

Lebeau, M., *See* Schneegans, M., 17:31584

Lebecka, J., Monitoring of radiation exposure from different natural sources in Polish coal mines, 17:31722 (IA;CA)

Lebedev, V., Magnetic field perturbation caused by bending vibrations of a quadrupole, 17:31469 (R;US)

Leboeuf, J.N., *See* Han, J.H., 17:32050

See Lynch, V.E., 17:32405

Leboeuf, P., Phase space approach to quantum dynamics, 17:32028 (R;FR)

LeCheminant, G.M., *See* Ruzicka, V., 17:30606

LeCocq, C., *See* Gaydosh, M., 17:31525

Lecolley, J.F., *See* Stuttge, L., 17:32280

Lecoq, P., *See* Schneegans, M., 17:31584

Ledin, S.R., Biological follow-up in short rotation cultivation on farmland, 17:30799 (R;SE;In Swedish)

Lee, G., *See* Schwartz, F.W., 17:31741

Lee, I.Y., Lifetimes of the low spin states in the superdeformed band of ^{192}Hg, 17:32243 (R;US)

Lee, J.H., *See* Papavassiliou, J., 17:31158

Lee, L., Spray nozzle pattern test for the DWPF HEME task technical plan, 17:30744 (R;US)

Lee, R.L., A finite element/finite difference approach for modeling three-dimensional flow and pollutant dispersion around structures, 17:31673 (R;US)

Lee, S.M., *See* Matsuse, T., 17:32279

Lee, T.S.H., Electromagnetic excitation of nucleon resonances, 17:32151 (R;US)

Lee, Y.W., *See* Wiebe, L.I., 17:31785

Leenheer, A. De, *See* Poupeye, E., 17:31819

Lefevre, F., *See* Ostendorf, R., 17:32253

See Thevenot, G., 17:32441

Legge, G.J.F., *See* Cholewa, M., 17:31852

Lehman, D.R., Investigations of the structure and electromagnetic interactions of few-body systems: Progress report, 1 August 1991–31 July 1992, 17:32205 (R;US)

Lehmann, E., Relativistic quantum hadron molecular dynamics (RQHMD) for heavy collisions, 17:32305 (IA;DE)

See Chawla, R., 17:30995

See Huang, S.W., 17:32303

See Khoa, D.T., 17:32294

See Puri, R.K., 17:32307

Lehtikangas, P., Part 1: Logging residues in piles - Needle loss and fuel quality. Part 2: Nitrogen leaching under piles of logging residues, 17:30806 (R;SE;In Swedish)

Leibowitz, L., *See* Pelton, A.D., 17:31204

Leichter, J., *See* Talmor, A., 17:31665

Leide, S., In vivo distribution and dosimetry of Tc-99m MIBI in man, 17:31906 (RA;US)

See Johansson, L., 17:31880

Leifels, Y., Exclusive studies of neutron and charged particle emission in relativistic heavy ion reactions, 17:32290 (IA;DE)

Leighton, D.T. Jr., *See* Krishnan, G., 17:30522

Leino, J., The mires and peat resources of the commune of Suonenjoki and their potential use, 17:30490 (R;FI;In Finnish)

The mires and their peat resources in Jaeppilae: Part 2 and summary, 17:30494 (R;FI;In Finnish)

The mires and their peat resources in Outokumpu. Part 1, 17:30508 (R;FI;In Finnish)

The peat resources of Hankasalmi and their usefulness. Part 1, 17:30502 (R;FI;In Finnish)

Leino-Forsman, H., *See* Pitkaenen, P., 17:30752
Leitha, T., Tc^{99m}-LDL as tracer for LDL-receptor mediated processes, 17:31802 (RA;US)
  Tc^{99m}-LDL kinetics in the isolated perfused rat liver, 17:31814 (RA;US)
Lenhoff, B., *See* Sahlqvist, L., 17:30831
Leon, A., Labeling, control and radiopharmaceutical evaluation of ^{99m}Tc-ADP as tumor seeking agent, 17:31818 (RA;US)
  See Verdera, S., 17:31823
Leon, E., *See* Leon, A., 17:31818
  See Verdera, S., 17:31823
Leonard, P.J.T., Are some of the luminous high-latitude stars accretion-powered runaways?, 17:32053 (R;US)
  Dynamical mass estimates in M13, 17:32056 (R;US)
Leonwich, J.A., *See* Lyon, M., 17:31994
Leroy, P., Preliminary interpretation of the Libretto-2 experimental results in terms of tritium permeation barrier efficiency, 17:30657 (R;FR)
Leroy, P.A., *See* Courtois, A., 17:32275
Lester, T.W., *See* Chen, W.Y., 17:30544
Lesueur, D., *See* Dunlop, A., 17:32375
Letellier, B.C., *See* Showalter, W.E., 17:30706
Leung, H., Thermophoretic collection of radon daughters with potential application to personal dosimetry, 17:31948 (IA;CA)
Leung, Waihung, Interfacial area and two-phase flow structure development measured by a double-sensor probe, 17:31387 (R;US)
Leushkin, E.K., *See* Alekseev, V.L., 17:32380
Levelut, M.N., *See* Beaudoing, G., 17:30656
Levis, M., *See* Villegier, J.C., 17:31251
Levkovich, N.V., *See* Chepurnoj, A.I., 17:31966
Lewandowski, E.F., *See* Porges, K.G., 17:32437
Lewine, J.D., *See* George, J.S., 17:31849
Lewis, M.A.K., *See* Korzekwa, D.R., 17:31236
Lewis, P.S., *See* Gorodnitsky, I., 17:31850
Leyva, A., *See* Cruz Inclan, C., 17:31252
Lezama, J.C., *See* Ferro, G.F., 17:31837
Li Bizhong, A novel bifunctional chelating agent α,ϵ-N,N′-bis(L-cysteinyl)-L-lysine for radiolabeling of monoclonal antibodies with technetium-99m, 17:31827 (RA;US)
Li Caiyun, Development for specific heat measuring apparatus of high T$_c$ superconductor in 80 $\approx$ 200 K temperature range, 17:32383 (R;CN;In Chinese)
Li Fanlian, *See* Hu Liangyou, 17:30786
Li Guixiang, *See* Zhang Hongdi, 17:31856
Li Guoxiang, Characteristics of low-q discharge on HT-6B tokamak, 17:32399 (R;CN;In Chinese)
Li Huanxing, *See* Li Caiyun, 17:32383
Li Jianmang, *See* Kruijf, W.J.M. de, 17:32516
Li Jianyong, *See* Wu Guoxin, 17:31858
Li Linzhong, *See* Li Guoxiang, 17:32399
  See Yin Xiejin, 17:32400
Li Manchang, *See* Gao Weisen, 17:31214
Li Peixia, *See* Zhou Quansheng, 17:31868
Li Rizhu, An experimental study of bubble detachment point in subcooled boiling at low pressure and velocity, 17:31381 (R;CN;In Chinese)
  The experimental determination of the primary system resistance for 5MW heating test reactor, 17:30970 (R;CN;In Chinese)
Li Shiling, *See* Chen Bingxian, 17:31602
Li Tiezhong, Skyrmions of different types, 17:32130 (R;CN;In Chinese)
Li Tongjun, *See* Wang Yinju, 17:30954
Li Wuping, *See* Yin Xiejin, 17:32400
Li Xinghuan, *See* Hu Liangyou, 17:30786
Li Xu, Data acquisition and processing system for coincidence measurements, 17:31545 (R;CN;In Chinese)
Li Zhaohuan, Level 1 probabilistic safety assessment on swimming pool reactor at IAE, 17:30971 (R;CN)
  See Cao Xuewu, 17:30887
li Zhongzhen, *See* Wan Yude, 17:31546
Li, C., *See* Wyon, C., 17:31250
Li, G.Q., *See* Huang, S.W., 17:32303
  See Lehmann, E., 17:32305
Li, H., The development and field testing of the thermoluminescent personal dosimeter for measuring exposure to radon and thoron daughters, 17:31557 (IA;CA)
Li, T.K., *See* Nishida, K., 17:30772
Li, Y., *See* Catalano, A., 17:30821
Liang Donghu, *See* Tang Zaimin, 17:30784
Liang Guozheng, *See* Hu Liangyou, 17:30786
Liang Rongqing, *See* Yin Xiejin, 17:32400
Liang, Y., *See* Daly, P.J., 17:32272
Liangshih Fan, *See* Tsuchiya, Katsumi, 17:31382
Liao Yuanzong, *See* Zhang Qinfen, 17:30638
Liao Zumin, *See* Feng Mingquan, 17:30889
Lichtenberg, A., Self-generated stochastic heating in an rf discharge: Annual progress report, May 15, 1991–May 14, 1992, 17:32410 (R;US)
Liebe, A., *See* Hourani, E., 17:32248
Liehr, M., *See* Gaarenstroom, S.W., 17:31143
Liewer, P., *See* Lynch, V.E., 17:32405
Light-Wahl, K.J., Internal energy effects on the solvation and reactivity of multiply charged biomolecules for electrospray ionization mass spectroscopy, 17:31764 (R;US)
Lim, S.C., Time-translation noninvariance of temporal gauge propagator, 17:32079 (R;XA)
Lim, S.M., *See* Kinuya, S., 17:31806
Limouris, G.S., *See* Schomaecker, K., 17:31783
  See Shukla, S.K., 17:31786, 17:31810
Limson-Zamora, M., The establishment of a national calibration centre for practical standards for bioassay and in vivo monitoring, 17:31954 (IA;CA)
Lin Yibing, Development of a ^{60}Co radioactive rod source used for γ-ray level gauge, 17:30787 (R;CN;In Chinese)
Lin, L.H., *See* Borghi, V.C., 17:31853
Lin, M.S., *See* Premuzic, E.T., 17:30853
Lindberg, L., Preliminary observations of electromagnetic radiation from plasma in presence of a double layer, 17:32436 (R;SE)
Lindbom, B., *See* Elert, M., 17:30749
Linden, T., The fermentation of lignocellulose hydrolysates with xylose isomerases and yeasts, 17:30802 (R;SE)
Lindenstruth, V., *See* Mueller, W.F.J., 17:32291
Linding Lauridsen, T., *See* Holm, E.L., 17:31408
Lindquist, H., *See* Hedman, G., 17:30814
Lindstroem, R., *See* Warnquist, B., 17:31139
Lingen, A. van, *See* Dieren, E.B. van, 17:31909
Lingjaerde, R.O., Nuclear power - status and development 1991/1992, 17:30925 (R;NO;In Norwegian)
Link, B., *See* Epstein, R.I., 17:32057
Linne, T., *See* Wongwatcharadumrong, R., 17:31861
Lisak, M., *See* Sergeev, A., 17:32409
Litai, D., Radiation safety in Israel: Thoughts and expectations, 17:32578 (RA;IL;In Hebrew)
  The environmental effects of the nuclear accidents in Chernobylsk (1986) and in the Ural mountains, 17:30965 (RA;IL;In Hebrew)
Litaudon, X., Lower hybrid wave coupling in Tore Supra through multi junction launchers, 17:32423 (R;FR)
Litov, L.B., *See* Vinogradov, V.B., 17:31577
Little, C., *See* Johnson, K.F., 17:31512, 17:31513
Liu Baohua, *See* Yu Yuanqi, 17:32447
Liu Dasen, *See* Wang Shuyu, 17:30788
Liu Dingqin, Economic benefits of increased discharge burnup for PWR: Prospect of increasing discharge burnup for Daya Bay NPP and Qinshan NPP1, 17:30924 (R;CN)
Liu Fenju, *See* Liu Keliang, 17:31872
Liu Hairui, Study of electron-beam-pumped KrF laser kinetics and calculation of energy deposition, 17:32048 (R;CN;In Chinese)
Liu Jianmin, Preparation of Y-Ba-Cu-O superconducting film above liquid nitrogen temperature, 17:32386 (R;CN;In Chinese)
Liu Keliang, Effects of irradiation on normal human lymphocytes, 17:31872 (R;CN;In Chinese)
  See Xu Yujie, 17:31874
Liu Lanhua, A nondestructive testing device for determining ^{235}U enrichment in power reactor fuel elements, 17:30951 (R;CN;In Chinese)
  See Liu Nangai, 17:30785
Liu Leiming, *See* Lai Dongxian, 17:31411

Liu Ming, *See* Tong Yunxian, 17:31377

Liu Nangai, A method of using γ-ray spectrum of ^{40}K to detect firecrackers, 17:30785 (R;CN;In Chinese)
See Liu Lanhua, 17:30951

Liu Rong, *See* Duan Shuyun, 17:32401

Liu Rongchuan, *See* Yu Zhi, 17:32371

Liu Shousun, *See* Yan Qimin, 17:31292

Liu Shulin, *See* Tian Jian, 17:30884

Liu Yuanfang, *See* Li Bizhong, 17:31827

Liu Zhiyong, *See* Li Rizhu, 17:30970

Liu Zhonghao, *See* Zhu Shoupeng, 17:31854

Liu, J.C., Calculations of scaled dose kernels for electrons in tissue, 17:31896 (RA;US)

Liu, J.Z., *See* Lan, M.D., 17:31264

Liu, Z., *See* Mueller, W.F.J., 17:32291

Liu, Z.C., Optical imaging systems for two phase flow, 17:30524 (RA;US)

Livengood, C.D., *See* Huang, H.S., 17:30475

Ljunggren, C., *See* Ahlbom, K., 17:31734, 17:31735

Lleres, A., *See* Desesquelles, P., 17:32268

Lloyd, S., *See* Johnson, K.F., 17:31512

Loar, J.M., *See* Southworth, G.R., 17:31726

Lobachevskij, P.N., *See* Govorun, R.D., 17:31968

Lobanov, Yu.Yu., Computation of Green function of the Schroedinger-like partial differential equations by the numerical functional integration, 17:32552 (R;SU)

Lobashev, V.M., *See* Borovikova, N.V., 17:32351

Loc'h, C., Pharmacological properties of lisuride radiolabeled derivatives used for in vivo imaging of D2 dopamine receptors, 17:31796 (RA;US)
See Maziere, B., 17:31797

Locke, C.D., *See* Overbey, W.K., 17:30588

Loehner, H., *See* Ostendorf, R., 17:32253

Loew, G., *See* Bulos, F., 17:31522

Loew, G.A., Review of studies on conventional linear colliders in the S- and X-Band regime, 17:31440 (R;US)

Logan, B.G., *See* Allen, S.L., 17:32474
See Moir, R.W., 17:32471

Lohsen, R.A., *See* Johnson, K.F., 17:31513

Lohson, R.A., *See* Johnson, K.F., 17:31512

Lokan, K.H., *See* O'Brien, R.S., 17:30614

London, R.A., *See* Eder, D.C., 17:31425

Londry, F., *See* Sullivan, J.D., 17:32445

Long, S., The potential effects of concurrent increases in temperature, CO$_2$ and O$_3$ on net photosynthesis, as mediated by rubisCO, 17:31687 (R;US)

Longhurst, G.R., Verification and validation of TMAP4, 17:32456 (R;US)
See Dolan, T.J., 17:32457

Longstaffe, F.J., *See* Ayalon, A., 17:31701

Longstreth, J.D., Balancing risk: Ethical issues in risk assessment, 17:31057 (R;US)

Loo, J.A., Tandem mass spectrometry of multiply charged proteins with electrospray ionization, 17:31765 (R;US)
See Ogorzalek Loo, R.R., 17:31762

Loos, R., *See* Andresen, H., 17:32261

Lopez, D.M., *See* Dewanjee, M.K., 17:31821

Lopez, J.V., Recirculation suction large break LOCA analysis of the Santa Maria De Garona Nuclear Power Plant using TRAC-BF1 (G1J1), 17:31026 (R;US)

Lopez, R.L., The challenge of performance-based MC&A training for R&D facilities, 17:32484 (R;US)

Lorencz, R., *See* Kugler, A., 17:31566

Lorentzon, U., *See* Larsson, B., 17:31135

Lorenz, J.C., Natural fracture systems studies, 17:30587 (R;US)

Lotfy, Y., *See* Huang, S.W., 17:32303
See Lehmann, E., 17:32305
See Puri, R.K., 17:32307

Louthan, M.R., Intergranular stress corrosion cracking: A rationalization of apparent differences among stress corrosion cracking tendencies for sensitized regions in the process water piping and in the tanks of SRS reactors, 17:30996 (R;US)

Louvel, M., *See* Stuttge, L., 17:32280

Love, L., *See* Crosetto, D., 17:31527

Loy, D.A., *See* Assink, R.A., 17:32374

Lu Changlong, *See* Feng Mingquan, 17:30889

Lu Darong, *See* Tian Baiyuan, 17:31212

Lu Huaichang, *See* Zhao Wenjin, 17:30890

Lu, Ming-Shih, Simulation of high level neutron coincidence counter, 17:30765 (R;US)

Lubeck, O.M., The performance realities of massively parallel processors: A case study, 17:32556 (R;US)

Lubell, M.S., Light weight, high field, stable, superconducting magnets for advanced transportation systems, 17:31171 (RA;US)

Lucas, M., *See* Hueber, C., 17:30873

Luccio, A., *See* Blaskiewicz, M., 17:31474

Lucherini, V., *See* Anghinolfi, M., 17:31530

Lucignani, G., *See* Paganelli, G., 17:31816

Lue, J.W., *See* Lubell, M.S., 17:31171

Luk'yanov, S.M., Setup for separation and investigation of β-n decay of neutron-rich nuclei, 17:31576 (R;SU;In Russian)

Lum, B., *See* Wang, F., 17:30738

Lumpkin, A.H., *See* Wilke, M.D., 17:31511

Lunardi, S., *See* Daly, P.J., 17:32272

Lundkvist, H., *See* Lehtikangas, P., 17:30806

Lung, A., *See* Whitlow, L.W., 17:32183

Lung, C.W., Bifurcations and chaos in dislocation multiplication process, 17:31229 (R;XA)

Lunt, D.L.J., *See* Irick, S.C., 17:31516

Luo Pingqing, *See* Lai Dongxian, 17:31411

Luong, T.T., *See* Saint Jores, P. De, 17:31431

Lussie, W.G., *See* McEligot, D.M., 17:31388, 17:31389

Luston, M., *See* Kovacik, M., 17:31403

Luton, J.N., *See* Lubell, M.S., 17:31171

Luttrell, C.R., *See* Swinson, W.F., 17:30973

Luttu, J., Technical prevention of cold environments, 17:31116 (R;FI;In Finnish)
The suitability and operational cost of the electrolytic phenol wate water purification, 17:31140 (R;FI;In Finnish)

Luukkanen, A., The mires and their peat resources in Nilsiae, 17:30505 (R;FI;In Finnish)
The mires and their resources in Kiuruvesi, 17:30492 (R;FI;In Finnish)

Lyczkowski, R.W., *See* Berry, G.F., 17:30536

Lykasov, G.I., Energy division and hadron transverse momenta in the quark-gluon strings model, 17:32111 (R;SU)

Lynch, T.P., *See* Lyon, M., 17:31994

Lynch, V.E., Performance of a plasma fluid code on the Intel parallel computers, 17:32405 (R;US)

Lynen, U., *See* Mueller, W.F.J., 17:32291

Lyon, J.F., *See* Uckan, T., 17:32404, 17:32433

Lyon, M., Hanford radiological protection support services annual report for 1991, 17:31994 (R;US)

Lysenko, W.P., *See* Johnson, K.F., 17:31513

Lystsov, V.N., *See* Belyaev, I.Ya., 17:31957

Lytle, J.M., *See* Chou, M.I.M, 17:30458
See Rapp, D.M. Ehrlinger, H.P., 17:30426

M

Ma Mei, *See* Liu Jianmin, 17:32386

Ma, C.H., *See* Uckan, T., 17:32433

Maardsjoe, O., NO$_x$ reducing measures at five Swedish waste incineration plants, 17:30868 (R;SE;In Swedish)

Maas, R., Injecting into AmPS when ring cavity operates at 476 MHz, 17:31520 (R;NL)
Using the 16 viewscreens during commissioning of AmPS, 17:31462 (R;NL)

Macapinlac, H., *See* Daghighian, F., 17:31902

MacDonald, A.H., *See* Akera, H., 17:32381

MacGowan, B., *See* Nilsen, J., 17:31423

MacGowan, B.J., *See* Koch, J.A., 17:31426
See Nilsen, J., 17:31424

Mackenzie, G.H., Beam instrumentation for an H$^-$ cyclotron meson factory, 17:31494 (RA;JP)

MacLean, G.D., *See* Sykes, T.R., 17:31805, 17:31811

MacLellan, J.A., *See* Bihl, D.E., 17:31990

MacLeod, R., *See* Gale, J., 17:31745
  See Herbert, A., 17:31743
Maclin, E., *See* George, J.S., 17:31849
Macrander, A.T., Emittance, brilliance, and bandpass issues related to an inclined crystal monochromator, 17:31614 (R;US)
Mader, A., *See* Bethge, K., 17:31299
Maecke, H., *See* Paganelli, G., 17:31816
Maeda, Kazuhide, *See* Koori, Norihiko, 17:32322
Maekilae, M., The peat recources of Ylaemaa and their usefulness, 17:30501 (R;FI;In Finnish)
  The peat resources of Miehikkaelae and their usefulness, 17:30487 (R;FI;In Finnish)
Maentylae, K., The energy contents of products and the indirect energy consumption of households, 17:31089 (R;FI;In Finnish)
Maentymaa, E., *See* Kiukaanniemi, E., 17:31667
Magal, O., *See* Aloni, A., 17:30791
Magana, J.W., *See* Krikorian, O.H., 17:30735
Maggiora, A., *See* Arvieux, J., 17:32154
Maggiore, N., Finiteness of the topological models in the Landau gauge, 17:32117 (R;FR)
Magnani, P., *See* Paganelli, G., 17:31816
Magne, R., *See* Litaudon, X., 17:32423
Magnuson, S.O., *See* Baca, R.G., 17:31697
Mahdavi, M.A., *See* Allen, S.L., 17:32474
Maino, G., *See* Fu, C.Y., 17:32284
Mair, R.J., *See* Clarke, B.G., 17:30697
Maiti, T.C., Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)
Maiya, P.S., *See* Park, J.Y., 17:30653
Majamaeki, O., *See* Ipatti, A., 17:30750
Majborn, B., Nuclear Safety Research Department. Annual progress report 1991, 17:32500 (R;DK)
Makris, A., *See* Papavassiliou, J., 17:31158
Malakhov, N.A., *See* Zhabitskij, V.M., 17:31535
Malaska, P., Exergy measure for the energy use of Finland economy in 1985, 17:31090 (R;FI;In Finnish)
Malek, F., *See* Nifenecker, H., 17:32319
Malen, T.E., *See* Oehman, G.A., 17:31371
Maley, M.P., *See* McHenry, M.E., 17:32391
Malhotra, R., *See* McMillen, D.F., 17:30435
Malik, K., *See* Bouska, P., 17:31230
Malinovski, Kh., *See* Datskov, V.I., 17:31488
Mallot, G.K., The spin of the nucleon in deep inelastic lepton scattering experiments, 17:32188 (R;US)
Mamonov, V.N., *See* Zhabitskij, V.M., 17:31535
Manatt, D.R., *See* Brinkman, M.J., 17:31601
Mandl, R.M., *See* Palmrose, D.E., 17:31008
Manickam, J., *See* Jardin, S.C., 17:32403
  See Nagayama, Y., 17:32434
Mann, P.L., *See* Bitner, D.M., 17:31820
Mannan, R.H., *See* Wiebe, L.I., 17:31915
Manoff, S., On the energy-momentum tensors for field theories in spaces with affine connection and metric: Generalized Bianchi identities and different energy-momentum tensors, 17:32102 (R;SU)
  On the energy-momentum tensors for field theories in spaces with affine connection and metric: Conditions for existence of energy-momentum tensors, 17:32103 (R;SU)
Manrique Garcia, J., Effectiveness in detecting fission fragments with ionization chambers, 17:32342 (I;CU;In Spanish)
Mansur, D.J., Laser surface profilometer with sub-Angstrom resolution, 17:31610 (R;US)
Mant, G., *See* Nelson, M.B., 17:32473
Mantica, P.F., Lifetime measurements in ^{118,120}Xe, 17:32245 (R;US)
Mantiply, E.D., Measurements of electric and magnetic fields in the Waianae, Hawaii area, 17:31041 (R;US)
Mao Zijun, *See* Chen Xiaomei, 17:31873
Mao, Y., *See* Morrison, H.I., 17:31937
Marcelin, G., Synthesis of octane enhancers during slurry-phase Fischer-Tropsch: Quarterly technical progress report No. 5, October 1, 1991–December 31, 1991, 17:30454 (R;US)
Marchal, N., Synthesis, characterization and reactivity of some lanthanide organometallics, 17:31316 (R;FR;In French)
Mardirossian, G., The stability in liver homogenate of In and Y anti-CEA antibody radiolabeled via DTPA and SCN-Bz-DTPA, 17:31807 (RA;US)
  See Hnatowich, D.J., 17:31830, 17:31831
Maresca, J.W. Jr., *See* Douglas, D.G., 17:30645
Margaliot, M., Rn gas level as an indicator to the radiological impact of Rn progeny, 17:31650 (IA;IL)
  The biological effects of exposure to RF radiation, 17:31926 (RA;IL;In Hebrew)
  See Shanai, Y., 17:31928
Margaritis, L., *See* Sawas-Dimopoulou, C., 17:31916
Margolis, S.B., Nonlinear stability of combustion-driven acoustic oscillations in resonance tubes, 17:32062 (R;US)
Margrita, R., *See* Beaudoing, G., 17:30655, 17:30656
Mariani, G., Intratumoral injection of 5-^{125}I-iodo-2′-deoxyuridine in patients with colon cancer, 17:31817 (RA;US)
  Strategies for pharmacokinetic modeling of monoclonal antibody biodistribution in man, 17:31808 (RA;US)
Marini, B., Development of a local approach for the intergranular fracture in low alloy steels, 17:31209 (R;FR)
Markham, J.R., *See* Brewster, B.S., 17:30542
Markley, F., Development of radiation hard scintillators, 17:31603 (R;US)
Marks, M.D., LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)
Markun, F., *See* Smith, L.L., 17:31287
Marland, S., Analyses of the reflector tank, cold source, and beam tube cooling for ANS reactor, 17:30994 (R;US)
Marra, S.L., *See* Andrews, M.K., 17:30743
Marrakchi, A.L., Fourth-rank gravity and cosmology, 17:32077 (R;XA)
  See Boutaleb J, H., 17:32081
Marreras, M., *See* Noda Gomez, J., 17:31862
Marsh, K.V., Hydrology and Radionuclide Migration Program: 1989 progress report, 17:31746 (R;US)
Marshall, T.O., An approved personal dosimetry service based on an electronic dosimeter, 17:31591 (RA;US)
Marsily de, G.D., *See* Jamet, P., 17:30729
Martian, P., Independent verification and validation testing of the FLASH computer code, Versiion 3.0, 17:31698 (R;US)
Martin, F.D., *See* Seright, R.S., 17:30567
Martin, G. Jr., History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants, 17:30897 (R;US)
Martin, L.J., *See* O'Brien, R.S., 17:30614
Martin, R.E., *See* Richman, M.W., 17:30528
Martina, L., *See* Saint Jores, P. De, 17:31431
Martinez, O., *See* Oliva, J.P., 17:31834
Martinez, R.J., *See* Lawson, A.C., 17:32041
Martinson, L., *See* Sandness, G.A., 17:30715
Marty, N., *See* Morlet, M., 17:32314
Martynov, A.S., *See* Shahbazian, B.A., 17:32329
Maruyama, T., Relativistic BUU-approach with momentum-dependent mean-fields, 17:32306 (IA;DE)
  See Lehmann, E., 17:32305
Marwil, E.S., *See* Longhurst, G.R., 17:32456
Masarik, J., *See* Reedy, R.C., 17:32251
Maskuniitty, H., *See* Vapaavuori, O., 17:30553
Maslov, O.D., Concentration of light homologs of superheavy elements in coal combustion, 17:31724 (R;SU;In Russian)
  See Buklanov, G.V., 17:31302
Mason, G.C., Evaluation of radiological hazards associated with mineral sandmining, 17:31955 (IA;CA)
Mason, T.E., *See* Hayden, S.M., 17:32387
Masse, R., *See* Chameaud, J., 17:31931
Mastrostamatis, S., *See* Cotsyfakis, C., 17:31794
  See Papadopoulos, M., 17:31782
  See Vavouraki, H., 17:31825
Masuda, S, *See* Umeki, H., 17:30731
Masui, J., *See* Nishida, K., 17:30772
Mather, S.J., *See* Boyle, C.C., 17:31803
Matheus Valle, J.L., Quantum group generalization of the heterotic QFT, 17:32085 (R;XA)

Matin, M.A., *See* Huang, S.W., 17:32303
See Khoa, D.T., 17:32294
See Lehmann, E., 17:32305
See Puri, R.K., 17:32307
Matkowsky, B.J., Studies in nonlinear problems of energy: Progress report, January 1, 1992–December 31, 1992, 17:31345 (R;US)
Matsumoto, Shosei, *See* Nishizawa, Kunihide, 17:30761
Matsuse, T., Statistical emission of complex fragments from highly excited compound nucleus, 17:32279 (R;FR)
Matsuzaki, Yoshimi, *See* Murakami, Yoshiki, 17:32463
Matsuzuru, Hideo, *See* Takahashi, Tomoyuki, 17:30702
Mattas, R.F., *See* Porges, K.G., 17:32437
Mattera, L., *See* Anghinolfi, M., 17:31530
Matthews, A., *See* Ganor, J., 17:31711
Matthews, D.L., *See* Koch, J.A., 17:31426
Mattsson, S., *See* Johansson, L., 17:31880
See Leide, S., 17:31906
See Vestergren, E., 17:31904
Mau, N.V., Low energy ^{16}O+^{208}Pb elastic scattering: an attempt to analyze the microscopic effective potential, 17:32318 (R;FR)
Mauel, M.E., *See* Nagayama, Y., 17:32434
Maurice, F., *See* Chaffron, L., 17:31249
Maximon, L.C., *See* Lehman, D.R., 17:32205
May, H., *See* Barnett, R.M., 17:32152
May, M.P., *See* Bostick, D.T., 17:30643
Mayanovic, R.A., *See* Gaarenstroom, S.W., 17:31143
Mayer, *See* Ostendorf, R., 17:32253
Mayer, R.H., *See* Daly, P.J., 17:32272
See Grabowski, Z.W., 17:32240
Mayes, B.W., Hadronic interactions at intermediate energies: Progress report, November 1987, 17:32155 (R;US)
Mayhall, D.J., Prediction of electromagnetic pulse generation by picosecond avalanches in high-pressure air, 17:31421 (R;US)
Mayle, R.W., *See* Wan, A.S., 17:31422
Maziere, B., Quantification of ^{76}Br-bromolisuride binding to central dopamine D2 receptors studied in baboon by PET, 17:31797 (RA;US)
See Bottlaender, M., 17:31798
See Loc'h, C., 17:31796
Maziere, M., *See* Bottlaender, M., 17:31798
See Brouillet, E., 17:31799
See Maziere, B., 17:31797
Mazurkevich, G.E., *See* Zhidkov, E.P., 17:31617
McCabe, J., *See* Khare, A., 17:32100
McCall, D.L., Quality performance-based training enhances safe and effective transport operations, 17:30649 (R;US)
McCarty, J.E., *See* O'Rourke, P.E., 17:31611
McConnell, J.W., *See* Toth, K.S., 17:32244
McConnell, P., *See* Stephens, J.J., 17:31240
McCormack, J.D., *See* Ritzman, R.L., 17:31015
McCulla, W.H., *See* Rosocha, L.A., 17:31662
McCulloch, M.T., *See* Vangosh, A., 17:31706
McCulloch, M.T., *See* Vengosh, A., 17:31715
McEligot, D.M., Natural convection between a vertical cylinder and a surrounding array, 17:31388 (R;US)
Turbulent natural convection between a perforated vertical cylinder and a surrounding array, 17:31389 (R;US)
McElroy, W.N., LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)
McEwan, A.J., *See* Sykes, T.R., 17:31805, 17:31811
McGlynn, S.P., A physico-chemical study of some areas of fundamental significance to biophysics: Annual report, 1991–1992, 17:31760 (R;US)
A physico-chemical study of some areas of fundamental significance to biophysics: Three-year comprehensive report, 1989–1992, 17:31761 (R;US)
McGowan, F.K., *See* Lee, I.Y., 17:32243
McGregor, C.K., *See* Anderson, S.E., 17:31285
McGuire, K.M., *See* Nagayama, Y., 17:32434
McHenry, M.E., Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)
McInroy, R.E., *See* Dyer, R.B., 17:31630
McKenney, A., *See* Demmel, J., 17:32504
McKinley, I.G., Integrated near-field assessment, 17:30730 (RA;SE)
See Frick, U., 17:31729
McKinney, W.R., *See* Irick, S.C., 17:31516
McKusick, K.A., *See* Castronovo, F.P. Jr., 17:31795
McLaughlin, S.B., Forest declines: Some perspectives on linking processes and patterns, 17:31749 (R;US)
McLeod, R.R., Temporal scattering and response software users' manual: Version 2.3, 17:32065 (R;US)
McMahon, F.H., LFK: Livermore FORTRAN kernel computer test, 17:32527 (CM;US)
McMakin, A.H., *See* Finch, S.M., 17:32000
McMillen, D.F., Cleavage and crosslinking of polymeric coal structures during pyrolysis: Final report, 17:30435 (R;US)
McMurtrey, C.D., *See* Shapiro, C., 17:30663
McNeil, J.R., *See* Milner, L.M., 17:31419
McNerney, A.J., *See* Soukas, A., 17:31477
Meacham, M., *See* Brambley, M.R., 17:31117
Mead, W.C., *See* Bell, S.E., 17:31304
Meadley, T., Radiation protection at a high grade uranium mine, 17:30613 (IA;CA)
Meale, B.M., *See* Bolander, T.W., 17:32007
Mecham, D.C., *See* McEligot, D.M., 17:31388, 17:31389
Mecking, H., *See* Kocks, U.F., 17:31235
Medici, T., *See* Shukla, S.K., 17:31786
Meer, J.W.M. van der, *See* Claessens, R.A.M.J., 17:31918
Mei Shengping, *See* Zhu Shoupeng, 17:31857
Mei, G., *See* Miller, L.F., 17:31993
Meijer, R.J., *See* Mueller, W.F.J., 17:32291
Meikle, A., *See* Hircq, B., 17:32440
Mel'nikov, V.A., *See* Zhabitskij, V.M., 17:31535
Mel'nikova, L.A., *See* Chepurnoj, A.I., 17:31966
Melamed, A., *See* Pirhonen, V., 17:30751
Melek, M., A theoretical kinematical study of the gradient of any cosmic scalar field, 17:32074 (R;XA)
Melezhik, V.S., Resonance amplification of the nuclear reaction X(a,b)Y near the a+X channel threshold, 17:32327 (R;SU)
Melnyk, A.J., *See* Kupferschmidt, W.C.H., 17:30943, 17:31339
Melo, I.S., Integrated control of Sclerotinia sclerotiorum with Benomyl and and Trichoderma harzianum resistant to benzimidazoles, 17:31923 (IA;BR;In Portuguese)
Mendoza, A., *See* Diaz Rizo, O., 17:31688
Mendoza, R., ASST Interconnect Region single phase pressure tests, 17:31528 (R;US)
Meneses, N., *See* Diaz Rizo, O., 17:31688
Menlove, H.O., *See* Rinard, P.M., 17:30709
Meot, F., A numerical method for the ray-tracing of polarized beams, 17:31451 (R;FR)
Mercer, J.R., *See* Wiebe, L.I., 17:31915
Merchez, F., *See* Bocquet, J.P., 17:32312
Merebashvili, Z.V., *See* Sisakyan, A.N., 17:32032
Mernagh, J.R., Design for beta radiation protection in the mining and milling of high grade uranium ore, 17:30630 (IA;CA)
Merriam, N., The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
Merriweather, R., *See* Jenkins, R.A., 17:31642
Merrouch, R., *See* Ostendorf, R., 17:32253
Mertens, J., *See* Yu, J., 17:31846
Mesa, S., *See* Diaz Rizo, O., 17:31688
Meshcheryakov, V.A., Analysis of $\pi\pi$ scattering with taking account of the KK-bar abd $\eta\eta$ thresholds, 17:32166 (R;SU;In Russian)
Messa, C., *See* Paganelli, G., 17:31816
Metag, V., *See* Ostendorf, R., 17:32253
Meth, M., Frequency spectrum generated by AGS Booster power swing, heavy ion cycle, 17:31481 (R;US)
Preliminary study of AC power feeders for AGS booster, 17:31479 (R;US)
Spectrum analysis of the power line flicker induced by the electrical test of the prototype Booster dipole, 17:31480 (R;US)
Methivier, A., Applied and theoretical study of textural and structural evolution of pure and doped zircon powders, 17:31257 (R;FR;In French)
Meyer, J.D., *See* Bethge, K., 17:31298, 17:31299
Meynendonckx, P., *See* Bonne, A., 17:30687

Micaelli, A., Path tracking control of mobile robots with techniques based on the use of curved abscissa, 17:31348 (R;FR;In French)
Michael, J.V., Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)
Michaels, G.E., Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
Michelmann, R., *See* Bethge, K., 17:31298, 17:31299
Miehe, Ch., *See* Bernas, M., 17:32228
Mihalczo, J.T., Validating criticality calculations for spent fuel with ^{252}Cf-source-driven noise measurements, 17:31352 (R;US)
Mikhajlov, I.N., Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)
Mikhova-Tsenova, N., *See* Chepurnoj, A.I., 17:31966
Miles, J.C.H, *See* Dixon, D.W., 17:31953
Miles, R.E., Development of location criteria for criticality alarm detector placements, 17:31362 (R;US)
Milewski, J.O., Characterizing laser fusion welded aluminum using synchrotron x-ray microtomography, 17:31406 (R;US)
Milkau, U., *See* Mueller, W.F.J., 17:32291
Miller, A., *See* Gidaspow, D., 17:30530
Miller, B., *See* Singh, S., 17:30552
Miller, B.G., *See* Longhurst, G.R., 17:32456
Miller, D.W., *See* Hajek, B.K., 17:30957
See Langner, D.F., 17:30771
Miller, G., *See* Andresen, H., 17:32261
Miller, H.G., *See* Davidson, N.J., 17:32227, 17:32295
See Kirchbach, M., 17:32094
Miller, J.D., The hydrophobic character of nonsulfide mineral surfaces as influenced by double-bond reactions of adsorbed unsaturated collector species: Progress report, 17:31295 (R;US)
Miller, J.M., *See* Sullivan, J.D., 17:32445
Miller, L.F., Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32, 17:31993 (RA;US)
Miller, M.C., *See* Langner, D.G., 17:30708
Miller, P., *See* Brambley, M.R., 17:31117
Miller, R., *See* Bulos, F., 17:31522
Miller, R.H., *See* Clendenin, J.E., 17:31524
Miller, R.L., *See* Shams, K.G., 17:30455
Miller, S.C., *See* Paschoa, A.S., 17:31951
Miller, S.D., *See* Reece, W.D., 17:32542
Milner, L.M., Latent image exposure monitor using scatterometry, 17:31419 (R;US)
Mioduszewski, P.K., *See* Uckan, T., 17:32404, 17:32433
Miroshnichesnko, A.L., Calculation of accelerating voltage shaping circuits by the gradient-ravine method, 17:31517 (R;SU;In Russian)
Misra, H., *See* Wiebe, L.I., 17:31785
Mitchell, S.J., *See* Schneider, K.J., 17:30713
Mitchell, T.E., *See* Wei, Wen-Cheng J., 17:31273
Mittig, W., *See* Orr, N.A., 17:32234
See Ostendorf, R., 17:32253
Miyamoto, A., A use of EGS4 in the TOPAZ detector simulator, 17:31500 (RA;JP;In Japanese)
See Ida, H., 17:31502
Miyazaki, Y., Study of geothermal resource evaluation by potential water volume method, 17:30834 (IA;JP;In Japanese)
Mjelde, R., Analysis of three-component seismic data with emphasis on anisotropy, 17:30564 (I;NO)
Mo, B., Stochastic methods in energy planning: Application to expansion planning and short-term load forecasting, 17:31068 (I;NO)
Moberg, L., *See* Eriksson, U., 17:30805
Modahl-Borg, C., Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)
Moeller, M.P., *See* Poston, R.W., 17:32544
Moesner, J., *See* Kaempfer, B., 17:32292
Mohammadioun, B., *See* Escalier des Orres, P., 17:30658
Moir, R.W., HYLIFE-2 progress report, 17:32471 (R;US)
Molesworth, T.V., *See* Findlay, D.J.S., 17:30688
Molodtsova, I.V., *See* Bastrukov, S.I., 17:32236
Molzahn, D., *See* Psarros, N., 17:30641
Momose, T., Improvement in the EGS4 code system - general purpose electron-photon Monte Carlo transport code system, 17:31583 (RA;JP;In Japanese)
Moncorge, R., *See* Wyon, C., 17:31250
Moneyhun, J.H., *See* Jenkins, R.A., 17:31642
Monne, G., *See* Manrique Garcia, J., 17:32342
See Sandin, C., 17:32343
Monnet, O., *See* Vacher, J., 17:31771
Monsecour, M., *See* Bonne, A., 17:30687
Montanez, O., Accidental exposure with X-ray diffraction equipment, 17:31992 (RA;US)
Monteiro, M.A.R., *See* Matheus Valle, J.L., 17:32085
Monticello, D.A., *See* Jardin, S.C., 17:32403
Montoya, M., *See* Jouan, D., 17:32313
Mook, H.A., *See* Hayden, S.M., 17:32387
Moore, R.H., The United States uranium registry tissue program: An update, 17:31932 (IA;CA)
Moore, T.R., *See* Albrecht, G.F., 17:31612
Moorhead, A.J., *See* Kim, Hyoun-Ee, 17:31613
Mor, D., K-Ar ages of the volcanism, southwestern Syria (the Muvlaat region), 17:31713 (IA;IL)
Mora, C., *See* Sorenson, K., 17:31065
Mora, M., *See* Cruz Inclan, C., 17:31252
Moran, D.L., *See* Rapp, D.M. Ehrlinger, H.P., 17:30426
Morand, C., *See* Desesquelles, P., 17:32268
Moreau, D., Lower hybrid current drive experiments in Tore Supra, 17:32422 (R;FR)
See Litaudon, X., 17:32423
Morel, J., Intercomparison of plutonium isotopic composition measurements by X-and gamma-ray spectrometry; results from the Pidie exercise, final report, 17:31291 (R;FR;In English, French)
Morell, W., *See* Hellmann, S., 17:30945
Moreno, E., Serological studies on bovine leukemia virus (BLV) infection in Costa Rica by ELISA, immunodiffusion and Western blot tests, 17:31863 (RA;XA)
Moreno, L., *See* Romero, L., 17:31732
Morgan, M.V., *See* Samet, J.M., 17:31939
Moriceau, H., *See* Villegier, J.C., 17:31251
Morimoto, A.K., *See* Fahrenholtz, J.C., 17:31364
Morinaga, Y., *See* Shiraishi, H., 17:31327
Morlet, M., A signature for isoscalar-spin transitions in (d,d') scattering at intermediate energy, 17:32314 (R;FR)
Morosin, B., *See* Assink, R.A., 17:32374
Morozov, N.A., *See* Borisov, O.N., 17:31489
Morris, W.F., *See* Krikorian, O.H., 17:30735
Morrison, H.I., Lung cancer mortality and radiation exposure among the Newfoundland fluorspar miners, 17:31937 (IA;CA)
Mortensen, G.A., Particle-fluid two-phase flow modeling, 17:31390 (R;US)
Two-phase flow modeling with discrete particles, 17:31129 (R;US)
Mosca, F., *See* Mariani, G., 17:31817
Moscovitch, M., Dose calculation algorithm for the Department of Energy Laboratory Accreditation Program, 17:31592 (RA;US)
Mosel, U., *See* Kalmbach, U., 17:32160
See Maruyama, T., 17:32306
Moser, P., A recovery study of electron irradiated Al-Li alloys, 17:32369 (R;FR)
Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)
See Dolveck, J.Y., 17:32370
Moskowitz, B., An 'in acceptance' comparison of Si + Au data and RQMD predictions, 17:32286 (IA;DE)
Moss, C.E., *See* Reedy, R.C., 17:32251
Moss, W.C., *See* Rambo, J.T., 17:31641
Mottershead, C.T., *See* Johnson, K.F., 17:31513
Mottola, E., Baryon and lepton number violation in the standard model at high energy, 17:32122 (R;US)
Mou Zongze, Numerical research of multiple integral, 17:32508 (R;CN;In Chinese)
Mouco, C.L., *See* Carvalho, S.M., 17:30610
Moulin, V., *See* Beaudoing, G., 17:30656
Mours, B., A data simulation program for the VIRGO detector, 17:31585 (R;FR)
Moussavi, M., *See* Duret, D., 17:31289
Moyers, J.C., Aging of non-power-cycle heat exchangers used in nuclear power plants: Operating experience and failure identification: Volume 1, 17:30877 (R;US)

Mozzano, S.G., Digital imaging systems: Final report, 17:31608 (R;US)
Mrowczynski, S., Relativistic transport equations from quantum field theory, 17:32255 (IA;DE)
Mrowka, S., *See* Koch, J.A., 17:31426
Mroz, T.H., Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)
Muccifora, V., *See* Anghinolfi, M., 17:31530
Mueller, A.C., *See* Hourani, E., 17:32248
Mueller, W.F.J., Fragmentation of gold projectiles: From evaporation to vaporization, 17:32291 (IA;DE)
Muentz, C., *See* Baltes, P., 17:32297
See Senger, P., 17:32296
Muether, H., *See* Bueckers, D., 17:32191
See Hjort-Jensen, M., 17:32270
Mufson, S., *See* Bower, C., 17:32069
Muis, R.P., *See* Kwast, H., 17:32452
Mull, V., Modifications of scalar and vector mesons in nuclear matter, 17:32226 (IA;DE)
Muller, J., The Ontario miners mortality study 1955-1977: Progress report, 17:31934 (IA;CA)
Mulshine, J., *See* Weiner, R.E., 17:31789
Munger, A.C., Hot-wire vs laser, is there a difference?, 17:31633 (R;US)
Munkstrup, N., *See* Jansson, L., 17:31056
Munthe Schultz, J., General computer programme for the calculation of areas of shadow on level surfaces, 17:31100 (R;DK;In Danish)
Munzenberg, G., *See* Bernas, M., 17:32228
Murakami, M., *See* Uckan, T., 17:32404, 17:32433
Murakami, Yoshiki, Comparison between a steady-state fusion reactor and an inductively driven pulse reactor, 17:32463 (R;JP)
Murao, R., *See* Yamamoto, a., 17:31400
Muraoka, H., Hypothesis on competition of thermal conduction zone and juvenile hydrothermal solution retention zones in the surroundings of magma, 17:30840 (IA;JP;In Japanese)
Murata, Y., *See* Ogawa, Y., 17:32010
See Takahashi, M., 17:30836
Murphy, C.A., *See* Ferro, G.F., 17:31837
Murphy, C.T., Modification to footprint to accommodate an external fixed-target hall, 17:31443 (R;US)
Murphy, W.M., Performance assessment perspectives with reference to the proposed repository at Yucca Mountain, Nevada, 17:30724 (RA;SE)
Musket, R.G., *See* Yoo, C.S., 17:31283
Mussalo, H., *See* Hiltunen, J.V., 17:31914
See Nikula, T.K., 17:31792
Musser, J., *See* Bower, C., 17:32069
Mutovin, G.R., *See* Khandogina, E.K., 17:31973
Muurinen, T., Inventory of mires and peat resources in Simo. Part 2, 17:30509 (R;FI;In Finnish)
The mires and peat resources of the commune of Simo in 1985-1986 and their potential use, 17:30500 (R;FI;In Finnish)
Muzykantov, V., *See* Danilov, S., 17:31788
Myers, D.K., Impact of occupational hazards on the life expectancy of uranium miners, 17:31940 (IA;CA)
Myers, H.S., Advanced Cooling Technology, Inc. quarterly technical progress report, 17:31097 (R;US)
Myers, M.J., *See* Bardies, M., 17:31907
Myles, K.M., *See* Kumar, R., 17:31188
Myrheim, J., A simple algorithm for large, non-linear or singular least squares problems, 17:32560 (R;NO)
See Bugge, L., 17:31598

N

Nadkarny, A., *See* Edwards, D.J., 17:32467
Naeslund, M., Reheating of flue gas in small gas-fired condensing boilers, 17:31109 (R;SE;In Swedish)
Nagai, H., *See* Naritomi, M., 17:31325, 17:31336
Nagashima, Keisuke, Numerical analysis of gas puff modulation experiment on JT-60U, 17:32428 (R;JP)
Nagashima, Takashi, *See* Tsuneoka, Masaki, 17:32461
Nagatsu, Toshiharu, *See* Nishizawa, Kunihide, 17:30761
Nagayama, Y., Observation of ballooning instabilities with medium toroidal mode number in high temperature tokamak plasmas, 17:32434 (R;US)
Naim, E., *See* Ben-Shachar, B., 17:31589
Nair, R.C., Mortality experience among workers in the uranium industry, 17:31936 (IA;CA)
Naish, C.C., Acoustic monitoring techniques for corrosion degradation in cemented waste canisters, 17:30691 (R;FR)
Nakach, R., *See* Hennequin, P., 17:32425
Nakagawa, K.Y., *See* Matsuse, T., 17:32279
Nakagawa, M., *See* Altobelli, S.A., 17:30519
Nakagawa, T., *See* Matsuse, T., 17:32279
Nakagawa, Tsuneo, *See* Baba, Mamoru, 17:32210
See Nakazawa, Masaharu, 17:32320
Nakamura, Hiroyuki, *See* Koori, Norihiko, 17:32322
Nakamura, M., *See* Momose, T., 17:31583
Nakamura, N., *See* Gotoh, S., 17:31259
Nakamura, Takashi, Spatial distribution of radionuclides produced by photonuclear reactions, 17:32336 (RA;JP;In Japanese)
Nakase, Yoshiaki, Investigation on the gas-phase radiolysis of metal complexes, 17:31328 (R;JP;In Japanese)
Nakashima, Takao, *See* Koori, Norihiko, 17:32322
Nakatsuka, Takao, Effects of the point-like nucleus model on the EGS simulation results, 17:31581 (RA;JP;In Japanese)
Nakazawa, Masaharu, JENDL Dosimetry File, 17:32320 (R;JP)
Namito, Yoshihito, Running EGS4 on Unix workstations and personal computers, 17:31582 (RA;JP;In Japanese)
Naney, M., *See* Solomon, A.D., 17:31042
Napier, W.A., Uranium measurements in urine: A summary of the operating experience at Canadian uranium mills, 17:31945 (IA;CA)
Nappa, A., *See* Leon, A., 17:31818
Naqvi, S.S., *See* Milner, L.M., 17:31419
Narita, O., *See* Momose, T., 17:31583
Naritomi, M., Batch-type tests on formations of volatile iodine species from aqueous iodide solution under ^{60}Co γ-rays irradiation, 17:31336 (RA;JP)
Studies on formation and transport of volatile iodine species in radiation field, 17:31325 (RA;JP)
Narra, V.R., *See* Harapanhalli, R.S., 17:31919
Naruse, Y., *See* Hircq, B., 17:32440
Nasonova, E.A., *See* Govorun, R.D., 17:31968
Nasstrom, J.S., *See* Rodean, H.C., 17:31677
Natividade, C.P., *See* Boschi Filho, H., 17:32088
Naumov, V.A., *See* Zaslavskaya, E.S., 17:32178
Navarro, J., *See* Garcia-Recio, C., 17:32230
Navickas, T.A., Design of a PCM data compressor: Final report, 17:32554 (R;US)
Navratil, G.A., *See* Nagayama, Y., 17:32434
Naylor, G.P.L., The interpretation of animal data in the calculation of doses from new radiolabeled compounds, 17:31881 (RA;US)
Neacy, W.P., *See* Wessels, B.W., 17:31883
Neerdael, B., *See* Bonne, A., 17:30687
Negadi, T., *See* Kibler, M., 17:32043
Neganov, B.S., On the check-up of the violation of the relativity principle by the investigation of the local properties of spin precession of relativistic electrons conducted at the storage ring, 17:31531 (R;SU;In Russian)
Neilsen, M.K., Bifurcations in elastic-damaging materials, 17:32366 (R;US)
Nellis, W.J., *See* Yoo, C.S., 17:31283
Nelson, G.C., *See* Gaarenstroom, S.W., 17:31143
Nelson, L.S., Interactions between drops of molten Al-Li alloys and liquid water, 17:31029 (R;US)
Nelson, M.B., LANSA: A large neutron scintillator array for neutron spectroscopy at Nova, 17:32473 (R;US)
Nemchik, J., *See* Kopeliovich, B.Z., 17:32233
Nemeth, J., Pauli blocking and dynamical multifragmentation calculations, 17:32257 (IA;DE)
See Ngo, H., 17:32258
Neretnieks, I., Near field transport processes, 17:30728 (RA;SE)
See Allard, B., 17:31755
See Pusch, R., 17:31733
See Romero, L., 17:31732
Neubert, W., *See* Kaempfer, B., 17:32292

Neumann, R.D., *See* Kinuya, S., 17:31806
See Weiner, R.E., 17:31789
Neuschaefer, G., *See* Johnson, K.F., 17:31512
Neves, M., Technetium-99m biguanide complexes: ^{99m}Tc-1,1-dimethylbiguanide, 17:31826 (RA;US)
Newberger, B.S., *See* Shih, H.J., 17:31468
Newcombe, H.R., *See* Nair, R.C., 17:31936
Newkirk, J.W., *See* Edwards, D.J., 17:32467
Newland, M.S., *See* Bowsher, B.R., 17:30872
Newman, C.E., *See* Cowart, J.S., 17:31159
Newnam, B.E., Development of XUV projection lithography at 60–80 nm, 17:31413 (R;US)
Newton, J., *See* Catalano, A., 17:30821
Newton, R.S., *See* DeForge, L.E., 17:31812, 17:31813
Ney, C.V., *See* Carvalho, S.M., 17:30610
Ng, E., *See* Wang, F., 17:30738
Nghiem, P., Helical siberian snake, 17:31450 (R;FR;In French)
Ngo, C., *See* Nemeth, J., 17:32257
See Ngo, H., 17:32258
Ngo, H., Surface multifragmentation investigated with a finite temperature spherical TDHF model, 17:32258 (IA;DE)
See Nemeth, J., 17:32257
Nguyen Van Giai, *See* Garcia-Recio, C., 17:32230
Nguyen, T., A Monte Carlo simulation of boron neutron capture reactions in cells - Microdosimetric aspects, 17:31774 (RA;US)
Nicek, F., *See* Blaha, V., 17:31809
Nichols, A.L., *See* Beard, A.M., 17:30893
Nichols, R.T., *See* Allen, M.D., 17:30899
Nicholson, D.M., *See* Stocks, G.M., 17:31215
Nicholson, H.W., Nuclear transparency and double beta decay of molybdenum 100: Annual progress report, March 1, 1992–January 31, 1993, 17:32246 (R;US)
Nickogossian, V.Ts., *See* Babayan, A.Z., 17:31499
Nielsen, S.P., *See* Aarkrog, A., 17:31730
See Chen, Q., 17:30898
Niemi, E., *See* Maentylae, K., 17:31089
Nierop, D., *See* Uhl, M., 17:32282
Nifenecker, H., Lambda attachment in fission: a probe of the necking dynamics, 17:32319 (R;FR)
Nikolaev, V.A., *See* Nikolaeva, R.M., 17:32235
Nikolaeva, R.M., Clusters in the nuclear model of chiral field solitons, 17:32235 (RA;SU)
Nikolenko, V.G., On different values of the neutron-electron scattering amplitude and neutron mean square charge radius obtained from the low-energy dependence of the scattering amplitude, 17:32325 (R;SU)
Nikula, T.K., ^{188}Re-EDTMP,, ^{188}Re-MDP, ^{188}Re-DMSA - The radiochemistry and radiopharmacology of the new potentially useful therapeutical agents, 17:31792 (RA;US)
See Hiltunen, J.V., 17:31914
Nilsen, J., Demonstration of a neon-like rubidium x-ray laser, 17:31424 (R;US)
Experiments on resonantly photo-pumped x-ray lasers, 17:31423 (R;US)
Nilson, D., *See* Allen, S.L., 17:32474
Nilsson, Aake, *See* Andersson, Arne, 17:31736
Nilsson, F., *See* Bergman, M., 17:30949
Nilsson, Lars, Modelling of intraweb heat and mass transfer - a literature review, 17:31134 (R;SE)
Nishi, Y., Analysis and evaluation of information network system, 17:32573 (IA;JP;In Japanese)
Nishida, K., Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy, 17:30772 (R;US)
Nishizawa, Kunihide, Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth, 17:30761 (RA;US)
Nisius, D., *See* Daly, P.J., 17:32272
Nisius, D.T., *See* Grabowski, Z.W., 17:32240
Nitsche, H., Solubility and speciation studies for nuclear repository performance assessment, 17:30727 (RA;SE)
Nitschke, J.M., *See* Toth, K.S., 17:32213
Nitzel, M.E., *See* Steele, R. Jr., 17:30993
Noakes, M.W., Development of robotics technology for remote characterization and remediationof buried waste, 17:31353 (R;US)
Noble, R.J., Particle production and survival in muon acceleration, 17:32189 (R;US)
Noda Gomez, J., The use of ELISA and nucleic acid hybridization tests in research and diagnosis of bovine leukosis virus, 17:31862 (RA;XA)
Noda, T., Analysis and evaluation of knowledge base and rule. Part 1.: Geochemical classification and significance of original water relating to geothermal system, 17:30851 (IA;JP;In Japanese)
See Takahashi, M., 17:30836
Noerenberg, W., *See* Herrmann, M., 17:32224
See Ivanov, Y.B., 17:32304
Noerregaard, A., Emission of non-combusted hydrocarbons from stationary motors and turbines, 17:31663 (I;DK;In Danish)
Nofar, I., *See* Starrfield, S., 17:32059, 17:32060
Nohtomi, Akihiro, *See* Koori, Norihiko, 17:32322
Noid, D.W., *See* Darsey, J.A., 17:31312
Nojiri, I., *See* Momose, T., 17:31583
Nordborg, C., Status of the JEF and EFF projects: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:30940 (R;NL)
Norden, U., Soil acidification and element fluxes as related to tree species in deciduous forests of south Sweden, 17:31725 (R;SE)
Nordqvist, R., *See* Ahlbom, K., 17:31734, 17:31735
Norman, M.R., *See* Akera, H., 17:32381
Normier, G., *See* Hoffschir, D., 17:31769
Noro, H., Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)
Norris, N.J., Shielded helix traveling wave cathode ray tube deflection structure, 17:31415 (PA;US)
Norum, B.E., Polarized electron sources for stretcher/storage rings, 17:31486 (RA;FR)
Nosslin, B., *See* Johansson, L., 17:31880, 17:31887
Notley, K.R., Computer modeling of airborne alpha radiation in mines, 17:31655 (IA;CA)
Nott, P.R., Dynamic simulation of pressure driven suspension flow, 17:30532 (RA;US)
Noujaim, A.A., *See* Qi, P., 17:31833
See Sykes, T.R., 17:31805, 17:31811
Novotny, R., *See* Ostendorf, R., 17:32253
Novozhilov, V.E., VKP-6 programmed time-to-digital converter with additional functions, 17:31412 (R;SU;In Russian)
See Barabash, I.P., 17:31616
Noyes, H.P., Second quantization in bit-string physics: Revision, 17:32047 (R;US)
Noynaert, L., *See* Bonne, A., 17:30687
Nozik, A.J., Photoelectrochemical production of hydrogen, 17:30796 (RA;SE)
Nyberg, B.R., *See* Abel, E., 17:31107
Nyberg, G., *See* Carlsten, S., 17:31737
Nygren, R.E., Low energy helium implantation in evaporated nickel surfaces, 17:32470 (R;US)
Report on the joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups, 17:32469 (R;US)
Nyyssoelae, H., The analysis of the energy consumption of an industrial building and development of the monitoring, 17:31137 (R;FI;In Finnish)

O

O'Brien, G.M., Earthquake-induced water-level fluctuations at Yucca Mountain, Nevada, April 1992, 17:31747 (R;US)
O'Brien, J.E., *See* McEligot, D.M., 17:31388, 17:31389
O'Brien, R.S., Radon and radon daughter concentrations over an extended uranium ore body, 17:30614 (IA;CA)
O'Brien, T.M., *See* Naish, C.C., 17:30691
O'Brien, W.S., Desulfurization of hot fuel gas produced from high-chlorine Illinois coals: Technical report, December 1, 1991–February 29, 1992, 17:30459 (R;US)
O'Donnell, F.R., *See* Walter, K.A., 17:30746

O'Gallagher, J.J., *See* Winston, R., 17:30828
O'Kelley, G.D., *See* Williams, D.F., 17:31330
O'Rourke, P.E., On-line process control monitoring system, 17:31306 (PA;US)
  Variable path length spectrophotometric probe, 17:31611 (PA;US)
O'Rourke, P.J., LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)
O'Shea, P.G., *See* Wilke, M.D., 17:31511
Obukhova, L.K., *See* Izmajlov, D.M., 17:31976
Odh, S.Aa., *See* Heintzenberg, J., 17:31672
Oehman, G.A., A simulation model for time-dependent drying, devolatilization and combustion of a single solid fuel particle, 17:31376 (R;FI)
  Experiences with numerical fluid flow and heat transfer calculations on multiprocessor computers: Lecture given at the Symposium on Chemical Engineering of the Finnish Chemical Congress in Helsinki, on November 9, 1989, 17:31374 (R;FI)
  Numerical fluid flow and heat transfer calculations on multiprocessor systems, 17:31371 (R;FI)
  Parallel computation of steady three-dimensional two-phase flows, 17:31375 (R;FI)
Oeschler, H., *See* Baltes, P., 17:32297
  See Senger, P., 17:32296
Oftedal, P., Low dose radiation effects: a holistic model, 17:31960 (RA;SU)
Ogawa, Y., Analysis and evaluation of resistivity data.: MT profiling of the southerm Tohoku district, 17:32010 (IA;JP;In Japanese)
Ogilvie, C.A., *See* Mueller, W.F.J., 17:32291
Ogorzalek Loo, R.R., Applying ion-molecule reactions to studies of gas-phase protein structure, 17:31762 (R;US)
Ogren, J., *See* Heintzenberg, J., 17:31672
Ohadi, M.M., *See* Somasundaram, S., 17:31142
Ohene, F., Rheological properties essential for the atomization of coal water slurries (CWS): Quarterly progress report, March 15, 1992–June 15, 1992, 17:30472 (R;US)
Ohsawa, Satoshi, *See* Kamitani, Takuya, 17:31538
Ohtsuka, N., *See* Khoa, D.T., 17:32294
Okagawa, S., *See* Naritomi, M., 17:31325, 17:31336
Okhunov, A.A., *See* Mikhajlov, I.N., 17:32237
Okladnova, O.V., *See* Izmajlov, D.M., 17:31976
Oksanen, E., *See* Annanmaki, M., 17:31560
Okubo, Y., Temperature gradient map of the Japanese Islands, 17:30850 (IA;JP;In Japanese)
  Underground structure and temperature structure of the Aso area obtained from gravity and magnetic analysis, 17:30842 (IA;JP;In Japanese)
Okuda, H., *See* Shiraishi, H., 17:31327
Okumura, Y., *See* Pamela, J., 17:32444
Olander, H., *See* Eronen, M., 17:30747
Oldenborgn, R.C., *See* Palmer, B.A., 17:31079
Oliva, J.P., Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc, 17:31834 (RA;US)
Oliver, B.M., *See* Garner, F.A., 17:32466
Oliver, P., *See* Verdera, S., 17:31823
Ollila, P., *See* Maentylae, K., 17:31089
Olsen, A., *See* Holm, E.L., 17:31408
Olsen, H.A., *See* Danielsen, K.M., 17:32179
Olsen, K.B., *See* Anheier, N.C. Jr., 17:31307
Olsher, R.H., Calibration correction factors for the Los Alamos neutron well, 17:31593 (RA;US)
Olson, H.P., Heat flux limits for control and safety rods, 17:31006 (R;US)
Olsson, Olle, *See* Carlsten, S., 17:31737
Olsson, U., *See* Berglund, S., 17:31145
Olszewski, J., *See* Chruscielewski, W., 17:31652
Olszewski, M., *See* Solomon, A.D., 17:31042
Oltz, D.F., Research on improved and enhanced oil recovery in Illinois through reservoir characterization, March 28, 1992–June 28, 1992, 17:30566 (R;US)
Omstedt, G., *See* Pleijel, K., 17:31660
Ondrejcin, R.S., *See* Thomas, J.K., 17:31038
Onishchenko, L.M., Determination of the synchronous phase in a phasotron, 17:31457 (R;SU;In Russian)
Oogoe, Takao, *See* Kamitani, Takuya, 17:31538
Oppe, J., *See* Pijlgroms, B.J., 17:32517
Oppenheim, I., Statistical mechanical theory of inelastic granular systems, 17:30527 (RA;US)
Orlett, M.J., Laboratory measurement of miscibility and pressure/temperature relationships of n-C_4F_{10}/CFC-114 mixtures, 17:31319 (R;US)
Orr, N.A., New mass measurements of neutron-rich nuclei near N=20°, 17:32234 (R;SU)
Orth, C.D., *See* Moir, R.W., 17:32471
Orton, R.D., *See* Buckley, G.D., 17:30962
Osada, M., *See* Watanabe, K., 17:31739
Osborn, D., *See* Roper, J.R., 17:31363
Osif, T.L., *See* Remick, R.J., 17:31085
Osnes, E., *See* Hjort-Jensen, M., 17:32239
Osscini, L., *See* Shukla, S.K., 17:31810
Ostendorf, R., Hard photon intensity interferometry in heavy ion reactions, 17:32253 (R;FR)
Osterheld, A.L., *See* Wan, A.S., 17:31422
Ostrovnoj, A.I., *See* Barabash, I.P., 17:31616
Oswald, R.A., *See* Gingrich, J.E., 17:31556
Oteo, J.A., *See* Klarsfeld, S., 17:32025
Ott, R.J., *See* Zweit, J., 17:31844
Ottaviani, M., *See* Loc'h, C., 17:31796
Ottenberger, W., *See* Nygren, R.E., 17:32470
Ottinger, C.A., *See* Harmon, C.D., 17:30917
Otto, R.A., *See* Krikorian, O.H., 17:30735
Ouden, A. den, *See* Emden, W. van, 17:31519
Oudshoorn, H.L., *See* Pijlgroms, B.J., 17:32517
Ouvry, J., *See* Andre, M., 17:32439
Ouweltjes, W., *See* Huntelaar, M.E., 17:30960
Ouyang, S., Sealing performance of bentonite and bentonite/crushed rock borehole plugs, 17:30710 (R;US)
Overbey, W.K., Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)
Owens, R., *See* Andresen, H., 17:32261
Oyen, W.J.G., *See* Claessens, R.A.M.J., 17:31918
Ozaki, S., RHIC status, 17:31427 (R;US)
Ozker, K., Tc-99m-labeled adriamycin, 17:31781 (RA;US)

P

Paajala, J., *See* Kiukaanniemi, E., 17:31667
  See Luttu, J., 17:31140
Paardekooper, A., *See* Voorbraak, W.P., 17:31550
Pacati, F.D., *See* Boffi, S., 17:32264
Pacheco, J.C., *See* Mau, N.V., 17:32318
Pachr, M., *See* Kugler, A., 17:31566
Padbury, E.H., *See* Knudsen, G., 17:31410
Padgett, K.M., Establishing and operating an incident response team, 17:30769 (R;US)
Paganelli, G., Three-step ^{99m}Tc-biotin immunoscintigraphy in the diagnosis of glioma patients, 17:31816 (RA;US)
Pahwa, S.B., Approach to geologic repository post closure system performance assessment, 17:30722 (R;US)
Pal, H.L., Automatic discrimination and read-out of tracks of RaA and RaC, on CR39 using image analysis, 17:31562 (IA;CA)
Paik, C.H., *See* Kinuya, S., 17:31806
Paik, I.K., *See* Geiger, G.T., 17:31033, 17:31034
Paine, A.J., *See* Boyle, C.C., 17:31803
Painter, J.F., *See* Cook, G.O. Jr., 17:32565
Pajunen, H., The mires and peat resources of the commune of Utajaervi and their potential use. Part 4, 17:30499 (R;FI;In Finnish)
  The mires and peat resources of the commune of Utajaervi and their potential use. Part 5, 17:30511 (R;FI;In Finnish)
Palm, E., The interaction between water waves and marine structures, 17:31409 (I;NO)
Palm, V., Modelling of cadmium fluxes on energy crop land, 17:30812 (R;SE)
Palmer, B.A., MCFC diagnostics: HCl detection, 17:31079 (R;US)
Palmrose, D.E., A model for calculation of RCS pressure during reflux boiling under reduced inventory conditions and its assessment against PKL data, 17:31008 (R;US)
Palounek, A., *See* Barnett, R.M., 17:32152

Palson, A., *See* Kupferschmidt, W.C.H., 17:31339
Palson, A.S., *See* Evans, G.J., 17:31338
See Kupferschmidt, W.C.H., 17:30944
Palsson, O.P., Time-continuous dynamic models for heat exchangers, 17:30845 (I;DK;In Danish)
Pamela, J., Design study of a 1 MV, 4 A, D- test bed in european community, 17:32443 (R;FR)
First results on D- production in the joint CEA-JAERI experiment at Cadarache, 17:32444 (R;FR)
The european programme on negative ion beam development, 17:32442 (R;FR)
Pan Jusheng, *See* Du Xiangwan, 17:31191
Pan Liangcai, *See* Lin Yibing, 17:30787
Pan Ying, *See* Zhao Wenjin, 17:30890
Pan Yuan, *See* Yu Yuanqi, 17:32447
Pan Ziqiang, Radiological environmental quality assessment of the nuclear industry in China over the past 30 years, 17:30964 (R;CN;In Chinese)
Panda, S., Remarks on the additional symmetries and W-constraints in the generalized KdV hierarchy, 17:32089 (R;XA)
Pang Mei, *See* Zhang Hongdi, 17:31856
Panzieri, D., *See* Arvieux, J., 17:32154
Papadopoulos, M., Correlation of lipophilicity to biodistribution of Tc-99m labelled aminothiols, 17:31782 (RA;US)
See Cotsyfakis, C., 17:31794
See Vavouraki, H., 17:31825
Papamichael, K., *See* Brambley, M.R., 17:31117
Papanastasiou, E., *See* Sawas-Dimopoulou, C., 17:31916
Papavassiliou, J., Measurements of cellular structure in spray detonation, 17:31158 (R;US)
Papykin, A.V., *See* Bastrukov, S.I., 17:32236
Pareja, R., *See* Moser, P., 17:32368
Parfenov, Yu.D., *See* Fedorenko, B.S., 17:31981
Parizadeh, K., Increasing the end user's productivity through seamless integration of applications with the database, 17:32572 (R;US)
Park, H.K., Magnetic fusion and project ITER, 17:32468 (R;US)
Park, J.Y., Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
Parke, W.C., *See* Lehman, D.R., 17:32205
Parker, J.L., *See* Nishida, K., 17:30772
Parker, M.J., Structure of the nocturnal boundary layer over a complex terrain, 17:31680 (R;US)
Parkey, R.W., *See* Goomer, N.C., 17:31780
Parks, M.B., Proceedings of the fifth workshop on containment integrity, 17:31018 (R;US)
Parrott, L., Energy and Environment, August 1992: A Sandia Technology Bulletin, 17:31062 (R;US)
Parsons, D.K., Comparison of TORT and THREEDANT on realistic X-Y-Z shielding problems, 17:32350 (R;US)
Parsons, R., *See* Finley, S.J., 17:30718
Parsons, T.V., *See* Bailey, M., 17:30689
Partridge, R., *See* Barnett, R.M., 17:32152
Paschoa, A.S., Uranium bearing particles in miners' and millers' lungs, 17:31951 (IA;CA)
Pasi, S., *See* Maentylae, K., 17:31089
Pastor, C., *See* Desesquelles, P., 17:32268
Pasztor, J., What role can nuclear power play in mitigating global warming?, 17:32494 (R;SE)
Pate, B.D., *See* Chan, G.L.Y., 17:31845
Patel, H.B., Radiopharmacology of new diiodo analogs of calichemicin fragment, 17:31800 (RA;US)
Patricio, L., *See* Neves, M., 17:31826
Patterson, C.M., H.I. report on the 200 Areas and associated laboratories for the week ending August 27, 1947, 17:30755 (R;US)
Patterson, D.C., *See* Geiger, G.T., 17:31033
Patzelt, P., *See* Psarros, N., 17:30641
Paul, M., *See* Herut, B., 17:31704
Paul, P.K., Effluent versus inlet header break analysis for SRS-reactor LOPA scenario, 17:30950 (R;US)
Paula, L. de, *See* Nemeth, J., 17:32257
See Ngo, H., 17:32258
Pavlenko, O.P., *See* Kaempfer, B., 17:32141
Pavlov, D.V., *See* Zhanlav, T., 17:32038
Payne, A.C. Jr., Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP): Volume 3, Part 2, Internal events accident sequence quantification: Appendices, 17:31023 (R;US)
Payne, S.A., *See* Thomas, I.M., 17:32476
Peacock, H.B., *See* Thomas, J.K., 17:30963
Pechtl, P.A., *See* Knight, R.A., 17:31296
Peck, S., R and D needs and opportunities for application of space vehicle cryogenic technology to Maglev systems, 17:31174 (RA;US)
Peery, J.S., *See* Budge, K.G., 17:32562
Pegourie, B., *See* Dubois, M.A., 17:32458
Pekala, R.W., Aerogels, emulsions, and composites: Controlling structure with organic sol-gel chemistry, 17:31282 (R;US)
See Kong, F.M., 17:31280
Pellegrin, J.L., *See* Briggs, D., 17:31497
Pelton, A.D., Thermodynamic analysis of phase equilibria in the iron-zirconium system, 17:31204 (R;US)
Peng Congrong, *See* Mou Zongze, 17:32508
Penner, J.E., The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)
Pennycook, S.J., *See* Jesson, D.E., 17:31268
Pensko, J., *See* Kompa, R., 17:31654
Pentlow, K.S., *See* Daghighian, F., 17:31902
Penttilae, P.I., *See* Hiltunen, J.V., 17:31914
See Nikula, T.K., 17:31792
Penzhorn, R.D., *See* Hircq, B., 17:32440
Perazza, A.A., *See* Kishinami, R.I., 17:30596
Peretz, F.J., Conceptual design summary, 17:30792 (R;US)
Perez, J., *See* Billinghurst, M.W., 17:31779
Perez, L., *See* Cooper, M.H., 17:30537
Perez, M., *See* Noda Gomez, J., 17:31862
Perez, R.B., Contributions of Gerard deSaussure to fission physics: Subthreshold and near-subthreshold measurements at the ORELA, 17:32277 (R;US)
Perinic, D., *See* Stuka, B., 17:31234
Perkins, F.W., *See* Jardin, S.C., 17:32403
Perona, J.J., Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)
Perrin, C., *See* Bocquet, J.P., 17:32312
Perry, G., *See* Helms, C., 17:31418
Pershagen, B., IEA wind energy.: Annual report 1991, 17:30854 (R;SE)
Pertsova, T.B., *See* Govorun, R.D., 17:31968
Pervushin, V.N., *See* Amirkhanov, I.V., 17:32037, 17:32145
See Sarikov, N.A., 17:32144
Peters, J.E., *See* Buckius, R.O., 17:30551
Peters, R.R., *See* Gauthier, J.H., 17:30717
Peters, W.A, *See* Gerjarusak, S., 17:30440
Peters, W.A., *See* Darivakis, G.S., 17:30439
Petersen, E., Analysis of heat accumulation capacities in relation to residential buildings, 17:31106 (R;DK;In Danish)
Petersen, K.E., *See* Larsen, H., 17:31050
Peterson, T.W., *See* Shadman, F., 17:30548, 17:30549
Peterson, V.L., Using MACCS for on-site worker dose calculations, 17:32002 (R;US)
Petit, E., *See* Gudewicz, P., 17:31453
Petitgirard, E., Massive fermion dispersion relation at finite temperature, 17:32150 (R;FR)
Petrie, T.W., *See* Allen, S.L., 17:32474
Petrina, L.G., *See* Antonenko, S.G., 17:31984, 17:31985
Pettit, P., *See* Hornbrook, J.W., 17:30568
Pettit, P.A., *See* Demiral, B.M.R., 17:30569
Petzoldt, R.W., *See* Moir, R.W., 17:32471
Peven, C.M., Rock Island Dam smolt monitoring, 1991, 17:30819 (R;US)
Peverly, J.H., *See* Surface, J.M., 17:31691
Peysson, Y., *See* Litaudon, X., 17:32423
Pfefferle, L.D., Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991, 17:30437 (R;US)
Pfeiffer, M., *See* Ostendorf, R., 17:32253
Pfeifle, T.W., Swelling pressure, water uptake, and permeability of 70/30 crushed salt/bentonite, 17:30721 (R;US)

Pfligersdorffer, P., *See* Steinhausler, F., 17:31552
Phillip, T., A distributed data acquisition and centralized data reduction system for flexible and efficient measurements, 17:31076 (R;US)
Phillips, C.R., *See* Khan, A., 17:31561
See Leung, H., 17:31948
See Pogorski, S., 17:31559
Phillips, D.R., *See* Emran, A.M., 17:31772
Phillips, J.H., *See* Anderson, M.T., 17:31010
Phillips, W.T., A simple method for producing a technetium-99m-labeled liposome which is stable in vivo, 17:31815 (RA;US)
Phinney, N., Review of SLC performance, 17:31441 (R;US)
Phythian, W.J., *See* Jenkins, M.L., 17:31203
Pianigiani, G., *See* De Blasi, F.S., 17:32083
Piatt, J.A., Integrated risk management for business survival, 17:32497 (R;US)
Picciotto, C., $\eta, K_L \rightarrow \pi^+\pi^-\gamma$ as tests of chiral models, 17:32177 (R;FR)
Pickett, R.D., *See* Smith, T., 17:31773
Piechowski, J., *See* Tirmarche, M., 17:31935
Pijlgroms, B.J., Simplified modeling and code usage in the PASC-3 code system by the introduction of a programming environment: Contribution to 'International Conference on Nuclear Criticality Safety-INC'91', Oxford, UK, 9-13 September 1991, 17:32517 (R;NL)
Pilar, N.V., *See* Zhabitskij, V.M., 17:31535
Pilch, M., Gas blowthrough and flow quality correlations for use in the analysis of high pressure melt ejection (HPME) events, 17:31030 (R;US)
See Allen, M.D., 17:30899
Pile, G.D., An engineering upgrade of the CWDD injector, 17:31472 (R;US)
Pilegaard Hansen, L., Fatigue tests on glued laminated wood beams: Partial report 4: Testing of series C, 17:30856 (R;DK;In Danish)
Pillay, M., *See* Cox, P.H., 17:31791
Pimentel, G., *See* Oliva, J.P., 17:31834
Pin, F.G., Driving a car with custom-designed fuzzy inferencing VLSI chips and boards, 17:32511 (R;US)
Pina, G., *See* Suarez, J.A., 17:30693
Pinert, J., *See* Schomaecker, K., 17:31783
Ping, Liu, The origin or the Archean Jardine iron formation-hosted lode gold deposit. Montana, 17:32014 (R;US)
Pinski, F.J., *See* Stocks, G.M., 17:31215
Piper, R.K., *See* Lyon, M., 17:31994
Pirhonen, V., Redox capacity of crystalline rocks - laboratory studies under 100 bar oxygen gas pressure, 17:30751 (R;FI)
Pirjamali, M., Development of catalysts for internal reforming in molten carbonate fuel cell, 17:31087 (R;SE)
Pitcher, E.J., *See* Wilke, M.D., 17:31511
Pitkaenen, P., Ground water chemistry and water-rock interaction at Olkiluoto, 17:30752 (R;FI)
See Pirhonen, V., 17:30751
Pittet, J.C., *See* Hoffschir, D., 17:31769
Pitts, J.H., *See* Moir, R.W., 17:32471
Pitz, W.J., *See* Cowart, J.S., 17:31159
See Papavassiliou, J., 17:31158
Piwnica-Worms, D., *See* Hwang, S.T., 17:31822
Pla-Dalmau, A., *See* Markley, F., 17:31603
Plassmann, P.E., *See* Canfield, T.R., 17:31265
See Jones, M.T., 17:32503
Pleijel, K., A comparison of different chemical models for use in regional simulations of air pollution, 17:31659 (R;SE;In Swedish)
The importance of chemical and meteorological processes in the atmosphere for meso-scale ozone formation, 17:31660 (R;SE;In Swedish)
Pletta, J.B., *See* Frank, D., 17:31628
Ploetz, K.L., *See* Tiegs, T.N., 17:31254
Ploszajczak, M., *See* Arvieu, R., 17:32020
See Bozek, P., 17:32132, 17:32156, 17:32252
Plotzke, K.P., Radioiodinated phospholipid ether analogs as noninvasive tumor imaging agents, 17:31784 (RA;US)
Plugge, M., Intra-site secure transport vehicle, 17:30774 (R;US)
Plyushchay, M.S., Does the quantization of a particle with curvature lead to the Dirac equation, 17:32092 (R;SU)
Pochodzalla, J., *See* Mueller, W.F.J., 17:32291
Podlesny, R., *See* Catalano, A., 17:30821
Podoloff, D., *See* Kasi, L.P., 17:31787
Poeton, R.W., IRDAM: Interactive rapid dose assessment model, 17:32544 (CM;US)
Pogorski, S., The transient response of radon and thoron chambers, 17:31559 (IA;CA)
Pohl, J.G., *See* Brambley, M.R., 17:31117
Pokotilovskij, Yu.N., Calculation of a variant of the 'inelastic' adiabatic spin-flipper for cold neutrons, 17:32346 (R;SU;In Russian)
Politano, M., *See* Starrfield, S., 17:32059, 17:32060
Polk, W.T., Computer assisted audit techniques for UNIX (UNIX-CAATS), 17:32509 (R;US)
Pollack, J.B., *See* Grant, K., 17:31676
Polle, A.N., Neutron metrology in the HFR: Steel irradiation R139-416, 17:30982 (R;NL)
Polli, E., *See* Anghinolfi, M., 17:31530
Polls, A., *See* Hjort-Jensen, M., 17:32270
Polonyi, J., The self consistent quark-gluon plasma, 17:32137 (IA;DE)
Pomet'ko, R.S., *See* Gorban', L.M., 17:31392
Pomilio, A.B., *See* Canellas, C.O., 17:31843
Pomphrey, N., *See* Jardin, S.C., 17:32403
Pomroy, C., *See* Limson-Zamora, M., 17:31954
Pook, E.A., *See* Marshall, T.O., 17:31591
Popov, A.B., *See* Nikolenko, V.G., 17:32325
Porch, W.M., Tributary and gap nighttime air flow comparisons, 17:31661 (R;US)
Porges, K.G., User's manual for the ARMLID (Argonne metallic lithium/isotopic dilution) tritium assay system, 17:32437 (R;US)
Porkka, H., *See* Luukkanen, A., 17:30492
Porter, C.E., *See* Williams, D.F., 17:31330
Porter, G.D., *See* Jong, R.A., 17:32475
Porter, J.L., *See* Nilsen, J., 17:31423, 17:31424
Portman, R., *See* Kupferschmidt, W.C.H., 17:30943, 17:30944, 17:31339
Post, R.F., *See* Moir, R.W., 17:32471
Poston, J.W. Sr., *See* Akabani, G., 17:31891, 17:31893
See Liu, J.C., 17:31896
See Shearer, T.W., 17:31895
Potter, T.F., Identification of building applications for a variable-conductance insulation, 17:31115 (R;US)
Potterveld, D.H., *See* Jackson, H.E., 17:31471
Poulet, M., Experimental study of charmed baryons at SuperLEAR, 17:32176 (R;FR)
Poupeye, E., ^{11}C-thymidine: An in-vivo tracer for cell proliferation, 17:31819 (RA;US)
Pourprix, M., Research and development of equipments of radon daughters in underground mines, 17:30628 (IA;CA)
Pourtier, F., *See* Villegier, J.C., 17:31251
Powell, C.J., *See* Gaarenstroom, S.W., 17:31143
Powell, J., Simulation of Maglev ride environment, 17:31168 (RA;US)
Power, J., *See* Johnson, K.F., 17:31512, 17:31513
Powers, D.A., An analysis of radionuclide behavior in water pools during accidents at the Annular Core Research Reactor, 17:31028 (R;US)
Audit calculations with CORCON-MOD 3 of the duration of superheat in NUREG/CR-5423, 17:31031 (R;US)
Poyarkov, V.A., To the problem of anomalous radiative proton capture in thick carbon targets, 17:32334 (R;SU;In Russian)
Pozdyshkina, O.V., Comparative study of qualitative cytogenetic effects induced by fractionated γ-neutron irradiation in man lymphocytes at G_0 and G_1 stages, 17:31970 (RA;SU;In Russian)
Pozo, R., *See* Choi, Jaeyoung, 17:32514
Pozrikidis, C., A review of numerical computations on the mechanics of deformable particles using boundary integral methods, 17:31384 (RA;US)
Pradel, J., *See* Tirmarche, M., 17:31935
Prael, R.E., *See* Waters, L., 17:32348
Prager, S., *See* Hokin, S., 17:32413
Prager, S.C., Current density fluctuations, nonlinear coupling, and transport in MST, 17:32412 (R;US)
Prather, W.S., *See* O'Rourke, P.E., 17:31306
Predom, B.M., *See* Didelez, J.P., 17:32317

Premuzic, E.T., Developments in geothermal waste treatment biotechnology, 17:30853 (R;US)
Presta, R., *See* Avicola, K., 17:32064
Price, R.L., *See* Lopez, R.L., 17:32484
Priedhorsky, W.C., *See* Bloch, J.J., 17:32054
Priestley, K., Active tectonics of the south Caspian basin and surrounding regions, 17:32017 (RA;US)
Prij, J., *See* Heijdra, J.J., 17:30684
Proise, M., Need for the detection of guideway misalignment and foreign objects, 17:31181 (RA;US)
Prokert, F., *See* Balagurov, A.M., 17:32373
Prokhorov, L.V., Invariant structures and static forces in gauge theories, 17:32109 (R;SU)
  Invariant structures in gauge theories and confinement, 17:32107 (R;SU)
Properzio, W.S., *See* Wilson, L.A., 17:31898
Proudfoot, J., [Effects of ionizing radiation on scintillators and other particle detectors]: Conference summary, 17:31541 (R;US)
Proust, E., *See* Leroy, P., 17:30657
Prout, D.L., Quasielastic scattering using the (p,n) reaction at 795 MeV, 17:32338 (R;US)
Psarros, N., Investigations concerning the exchange of iodine from non-volatile organic iodine compounds. Final report, 17:30641 (I;DE;In German)
Pu, Q., *See* Li, H., 17:31557
Pu, Y.H., *See* Matsuse, T., 17:32279
Pujol, C., *See* Bernas, M., 17:32228
Pujol, E., *See* Henge-Napoli, M.H., 17:31989
Punjak, W.A., *See* Shadman, F., 17:30548, 17:30549
Puri, R.K., Medium dependent pion-production in heavy-ion collisions within the quantum molecular dynamics, 17:32307 (IA;DE)
  See Huang, S.W., 17:32303
  See Khoa, D.T., 17:32294
  See Lehmann, E., 17:32305
Purviance, R.T., *See* Gabor, J.D., 17:30997
Purvis, J.W., RATLER: Robotic All-Terrain Lunar Exploration Rover, 17:31365 (R;US)
Pusch, R., Description of transport pathways in a KBS-3 type repository, 17:31733 (R;SE)
  Final report of the rock sealing project - Sealing properties and longevity of smectitic clay grouts, 17:30733 (R;SE)
  Final report on Test 4 - Sealing of natural fine-fracture zone, 17:31738 (R;SE)
Puzynin, I.V., *See* Amirkhanov, I.V., 17:32037, 17:32145
  See Sarikov, N.A., 17:32144
  See Zhanlav, T., 17:32036, 17:32038, 17:32553
Puzynin, V.I., *See* Gusev, V.V., 17:32091

Q

Qi, P., Biological evaluation of selected carbohydrate antibody conjugates, 17:31833 (RA;US)
Qian Shunfa, *See* Huang Yucai, 17:31606
Qu Jiedi, Comprehensive research on sealing behaviour of reactor vessel of 300 MWe nuclear power plant, 17:30880 (R;CN;In Chinese)
Quadrel, R.W., *See* Brambley, M.R., 17:31117
Quam, W., *See* Hardy, K.A., 17:31597
Quan Huiqin, *See* Diao Wentang, 17:31267
Queiroz, M., Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport: Quarterly technical progress report, March 15, 1992–June 14, 1992, 17:30550 (R;US)
Quick, R.M., *See* Davidson, N.J., 17:32295
  See Kirchbach, M., 17:32094
Quintero, B., *See* Castaneda Donate, S., 17:30939
Quiroga-Teixeiro, M.L., *See* Sergeev, A., 17:32409

R

Raatschen, W., Demand controlled ventilating systems: Sensor market survey, 17:31091 (R;SE)
Rabin, B.H., Fabrication of high temperature materials by exothermic synthesis and subsequent dynamic consolidation, 17:31276 (PA;US)
Radar, J., *See* Cooper, M.H., 17:30537
Radici, M., *See* Boffi, S., 17:32264
Radke, C.J., *See* Kovscek, A.R., 17:30571
Radousky, H.B., *See* Lan, M.D., 17:31264
Raemoe, T., A preliminary study of the energy management system of middle-sized electric utilities, 17:31074 (R;FI;In Finnish)
Raffenetti, R.C., SWEB: Scientific Workstation Evaluation Benchmark, 17:32523 (CM;US)
Ragoucy, E., Continuous realizations of extended conformal algebras, 17:32120 (R;FR)
  See Frappat, L., 17:32116
Raguin, M., *See* Guentay, S., 17:30875
Rajagopal, K.R., A theoretical and numerical study of the flow of granular materials, 17:30529 (RA;US)
Raka, E., *See* Zhang, S.Y., 17:31478
Raman, S., *See* Parker, M.J., 17:31680
Rambo, J.T., Sensitivities of calculated residual stress to separation distances of two simultaneous events, 17:31641 (R;US)
Ramsdell, J.V., Summary of the March 25–26, 1991 atmospheric model working meeting: Hanford Environmental Dose Reconstruction Project, 17:31999 (R;US)
Randall, D.A., Studies of the role of clouds in CO$_2$-induced climate change: Progress report, September 15, 1991–September 14, 1992, 17:31646 (R;US)
Randich, E., Alternate electrode materials for the SP100 reactor: Final report, 17:31263 (R;US)
Randolph, H.W., *See* Geiger, G.T., 17:31034
Randrup, J., Inclusion of fluctuations in BUU nuclear dynamics, 17:32254 (IA;DE)
  See Batko, G., 17:32298
Raney, C.W., An analog macromodel of the SG1525A PWM for use with SPICE2G.6 simulators, 17:31416 (R;US)
Ranne, A., *See* Maentylae, K., 17:31089
Ransom, C.B., *See* Hartley, R.S., 17:30942
Rao, D.V., *See* Harapanhalli, R.S., 17:31919
Rapp, D.M. Ehrlinger, H., Carbonation as a binding mechanism for coal/calcium hydroxide pellets: Technical report, December 1, 1991–February 29, 1992, 17:30426 (R;US)
Rappenecker, G., *See* Didelez, J.P., 17:32317
  See Hourani, E., 17:32248
Rasmuson, D.M., Workshop on the use of PRA methodology for the analysis of reactor events and operational data: Proceedings, 17:31019 (R;US)
Rasmussen, D.A., *See* Uckan, T., 17:32404, 17:32433
Rasmussen, P., Slow-running permanent magnetic generators for wind power etc. 1.5-100 kW: Calculations and draft, 17:30858 (I;DK;In Danish)
Rastogi, S., *See* Cooper, M.H., 17:30537
Rathi, A.K., Simulation and intelligent vehicle highway systems, 17:31119 (R;US)
Rathkjen, A., *See* Pilegaard Hansen, L., 17:30856
Ratis, Yu.L., Scaling effects and properties of Δ-isobar resonances, 17:32192 (IA;DE)
  See Gareev, F.A., 17:32256
Ratti, A., *See* Blaskiewicz, M., 17:31474
  See Meth, M., 17:31481
Ravn, H.L., *See* Hourani, E., 17:32248
Rax, J.M., *See* Litaudon, X., 17:32423
  See White, R.B., 17:32435
Ray, A., Orbiting: toward a unified model of nucleus-nucleus collision or excitation of nuclear molecular states in heavy ion collisions?, 17:32276 (R;US)
Ray, E.M., Penetration of Hydrogen clusters from 10 to 120 kev/u in carbon foils. Study of their slowing-down and charge distribution of emerging fragments, 17:32341 (R;FR;In French)
Ray, E.R., Solid oxide fuel cell processing using plasma arc spray deposition techniques: Final report, 17:31083 (R;US)
Raychaudhuri, A., *See* Raychaudhuri, S., 17:32190
Raychaudhuri, S., Detection of charged Higgs bosons through the rare decay $H^+ \rightarrow W^+\gamma$, 17:32190 (R;XA)
Raz, R., *See* Roze, V., 17:30617

Read, A.L., *See* Bugge, L., 17:31598
Read, D., Status report on geochemical modelling, 17:30700 (R;DE)
Rebreyend, D., *See* Bocquet, J.P., 17:32312
Rechardt, T., *See* Abel, E., 17:31107
Redfearn, A., *See* Suter, G.W. II, 17:31699
Reece, K., *See* Ahrens, L., 17:31476
Reece, W.D., SADDE-MOD1: Scaled absorbed dose distribution evaluator, 17:32542 (CM;US)
VARSKIN: Dose calculation of contamination of the skin, 17:32543 (CM;US)
Reedy, R.C., Radioactivities induced in some LDEF samples, 17:32251 (R;US)
Rees, D.E., *See* Regan, A.H., 17:31515
Reeves, T.K., *See* Overbey, W.K., 17:30588
Regan, A.H., Rf system description for the ground test accelerator radio-frequency quadrupole, 17:31515 (R;US)
Regel, K., *See* Rosemann, M., 17:31967
Regnier, P., *See* Blanc, J.Y., 17:31205
See Chaffron, L., 17:31249
Rehme, K., *See* Wu Shaorong, 17:31378
Reichelt, T., Polarized electron physics at ELSA, 17:31454 (RA;FR)
Reidel, G., Coupling of ^{125}I-EGF to serum albumin to stabilize the radioiodine bond: Radiolabeling, purification by HPLC, stability and biodistribution in mice, 17:31829 (RA;US)
Reifsnider, K.L., *See* Stinchcomb, W.W., 17:31260
Reiman, A.H., *See* Jardin, S.C., 17:32403
Reimers, P., Quality assurance of radioactive waste packages by computerized tomography, 17:30692 (R;FR)
Reimk, Radon emanation at the Muellenbach research uranium mine and its effects on ventilation planning, 17:30625 (IA;CA)
Reinhardt, F.W., *See* Guidotti, R.A., 17:31045
Reinhardt, G.C., Nuclear employment policy and optimal exchange strategies, 17:31194 (R;US)
Reis, J., Oil recovery improvement through profile modification by thermal precipitation, 17:30570 (R;US)
Reisdorf, W., FOrPI studies of Au on Au collisions at SIS energies, 17:32289 (IA;DE)
Remaud, B., *See* Jouan, D., 17:32313
Remick, R.J., Impact of protective oxides on cathode-side resistances in MCFCs, 17:31085 (R;US)
Rempe, J.L., Most likely failure location during severe accident conditions, 17:31009 (R;US)
Rempel, T., *See* Hokin, S., 17:32413
Rempel, T.D., *See* Prager, S.C., 17:32412
Ren Juqian, Excitation adjustable system of toroidal field waveform for tokamak HL-1, 17:32397 (R;CN;In Chinese)
Ren Lianzhi, *See* Li Caiyun, 17:32383
Renard, F.M., *See* Blondel, A., 17:32200
Renou, G., *See* Hourani, E., 17:32248
Rensink, M.E., *See* Allen, S.L., 17:32474
Reolon, A.R., *See* Anghinolfi, M., 17:31530
Reposeur, T., *See* Didelez, J.P., 17:32317
Revankar, S.T., *See* Leung, Waihung, 17:31387
Reviol, W., *See* Garg, U., 17:32242
Revokatov, P.O., *See* Kuz'min, R.N., 17:32427
Rey, A., *See* Leon, A., 17:31818
Rey, G., *See* Litaudon, X., 17:32423
Reynolds, J.C., *See* Kinuya, S., 17:31806
Reynolds, J.G., Utilizing asphaltene pyrolysis to predict pyrolysis kinetics of heavy crude oil and extractable native bitumen, 17:30603 (R;US)
Rhea, T.A., *See* Moscovitch, M., 17:31592
Rho, M., Nuclear physics in a swelled world, 17:32203 (R;FR)
Rhoades-Brown, M.J., The partial beam lifetime at RHIC due to Coulomb dissociation of the nucleus, 17:31448 (R;US)
Rhodes, J.W., Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 1, Text, 17:32004 (R;US)
Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 2, Appendices, 17:32005 (R;US)
Ri-Kai, W., Activated carbon filter paper method for the measurement of radon and thoron concentration, 17:31564 (IA;CA)
Ricco, G., *See* Anghinolfi, M., 17:31530
Richard, F., Higgs production in a photon-photon collider, 17:32171 (R;FR)
Search for new phenomena at LEP, 17:32168 (R;FR)
Richard, J.M., Some open issues in nucleon-antinucleon interaction, 17:32164 (R;FR)
Richardson, B.S., *See* Noakes, M.W., 17:31353
Richardson, J.W. Jr., Background modelling in Rietveld analysis, 17:31288 (R;US)
Richer, H.B., *See* Leonard, P.J.T., 17:32056
Richien, S., *See* Somasundaram, S., 17:31142
Richman, M.W., Granular flows down bumpy inclines, 17:30528 (RA;US)
Richter, H.J., Mixing and settling in continuous metal production: Progress report, September 15, 1991–May 31, 1992, 17:31221 (R;US)
Rickel, D.G., Ross Priory workshop presentation, 17:31360 (R;US)
Rider, B.F., *See* England, T.R., 17:32339
Rieger, R., *See* Andresen, H., 17:32261
Riehle, T.J., Radar operations process waste assessment: Solder pot tinning, 17:31132 (R;US)
Rigaud, D., *See* Litaudon, X., 17:32423
Rigney, M.M., *See* Didelez, J.P., 17:32317
Rimkus, W.A., Meeting future exhaust emissions standards using natural gas as a vehicle fuel: Lessons learned from the natural gas vehicle challenge '92, 17:31189 (R;US)
Rinard, P.M., Nondestructive assays of 55-gallon drums containing uranium and transuranic waste using passive-active shufflers, 17:30709 (R;US)
Rink, J., Methods reducing doppler broadening in laserspectroscopy of stored ions and the isotope shifts of hafnium, 17:32356 (R;DE;In German)
Rintsu, Y., *See* Momose, T., 17:31583
Riordan, E.M., *See* Whitlow, L.W., 17:32183
Ripka, G., The modification of hadrons propagating in dense media, 17:32186 (R;FR)
Rippel, R., *See* Hellmann, S., 17:30945
Rischke, D.H., Phase-transitions in nuclear matter: Deconfinement of quarks and gluons?, 17:32220 (IA;DE)
Ritchie, R.A., *See* Davidson, N.J., 17:32227, 17:32295
Ritvanen, K., *See* Maentylae, K., 17:31089
Ritzman, R.L., Overview of the ACF iodine project, 17:31013 (RA;JP)
The ace large scale iodine experiment at the Containment Systems Test Facility (CSTF), 17:31015 (RA;JP)
Rivet, M.F., *See* Jouan, D., 17:32313
Rizeq, G., *See* Shadman, F., 17:30549
Rizzo, T.G., Probing new gauge boson couplings at hadron, 17:32185 (R;US)
Robaittaille, G., *See* Clapper-Gowdy, M., 17:31686
Roberson, K.R., *See* Wheeler, M.F., 17:31728
Roberts, D., *See* Grindrod, P., 17:31742
Roberts, K.H., *See* Haber, S.B., 17:31001
Robertson, I.M., *See* Smalinskas, K., 17:31202
See Vetrano, J.S., 17:31201
Robertson, R.G.H., Neutrino mass, 17:32202 (R;US)
Robey, T.H., *See* Barnard, R.W., 17:30719
Robinson, J.M., *See* Dyer, R.B., 17:31630
Robinson, P., *See* Grindrod, P., 17:31742
Robinson, S.J., *See* Mantica, P.F., 17:32245
Roche, M., *See* Kucera, G.H., 17:31078
See Thevenot, G., 17:32441
Rock, S., *See* Whitlow, L.W., 17:32183
Rockwood, A.L., *See* Light-Wahl, K.J., 17:31764
Rodean, H.C., Comparison of two stochastic models of scalar diffusion in turbulent flow, 17:31677 (R;US)
Rodriguez, A., *See* Verdera, S., 17:31823
Rodriguez, R., *See* Diaz Rizo, O., 17:31688
Roesener, W.S., *See* Wolford, A.J., 17:31024
Rofer, C.K., *See* Dyer, R.B., 17:31630
Rogers, J.D., *See* Findlay, D.J.S., 17:30688

Rogers, Y.C., Quantitative analysis of plutonium and uranium using reversed-phase liquid chromatography and spectrophotometric detection, 17:31305 (R;US)

Rohach, A.F., Low enrichment fuel conversion for Iowa State University: Progress report, August 1, 1991–July 31, 1992, 17:30974 (R;US)

Rolfe, S.T., *See* Theiss, T.J., 17:31218

Rollett, A.D., *See* Castro, R.G., 17:31258
See Korzekwa, D.R., 17:31236

Romero, L., A compartment model for solute transport in the near field of a repository for radioactive waste (calculations for Pu-239), 17:31732 (R;SE)

Ronan, M., *See* Bulos, F., 17:31522

Rong Chaofan, *See* Zheng Jinmei, 17:31544

Roos, J.C., *See* Dieren, E.B. van, 17:31909

Roots, E.F., Comments on the state of knowledge about climatic and geological processes and extra-terrestrial events, 17:31685 (RA;CA)

Roper, J.R., Thermal stress and strain analysis in traveling autogenous welds, 17:31363 (R;US)

Rosato, A.D., Methodology of a radiosonde system for the non-intrusive tracking of a particle in a flow, 17:30523 (RA;US)

Roscoe, R.J., Sex ratio of first-born children of United States uranium miners, 17:31943 (IA;CA)
Update of the United States Public Health Service uranium miners cohort study, 17:31941 (IA;CA)

Rosek, O., Radiosensitivity of L5178Y mice lymphoma cells and state of antioxidant enzyme system, 17:31971 (RA;SU;In Russian)
See Bouzhik, Eh., 17:31972

Rosemann, M., Microdosimetrical calculations of the rate of repairable DNA - double strand breaks based on a model for the interpretation of experiments with different doses and radiation qualities, 17:31967 (RA;SU)

Rosen, M.D., *See* Eder, D.C., 17:31425

Rosen, R.S., Silicide layer growth rates in Mo/Si multilayers, 17:31244 (R;US)

Rosenstraus, M.J., Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated $F(ab')_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8, 17:31832 (RA;US)

Rosenzweig, *See* Balachandran, 17:32066

Roser, T., *See* Ahrens, L., 17:31476

Rosler, L., *See* Hourani, E., 17:32248
See Morlet, M., 17:32314

Rosina, M., The chiral and the deconfinement phase transition in the chromodielectric model, 17:32139 (IA;DE)

Rosinski, S.T., Nuclear reactor pressure vessel-specific flaw distribution development, 17:30900 (R;US)

Rosocha, L.A., Innovative technologies for removing toxic compounds from groundwater and air, 17:31662 (R;US)

Rossini, I., Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)

Rost, E., Theoretical nuclear physics: Progress report, October 1, 1991–August 1, 1992, 17:32206 (R;US)

Rotbard, G., *See* Hourani, E., 17:32248

Rote, D., Threshold Maglev research and development program - A no regrets approach to Maglev R and D, 17:31185 (RA;US)

Rothman, E.M., *See* Koziar, G., 17:30589

Rothman, S.J., Oxygen diffusion in high-$T_c$superconductors, 17:31246 (R;US)

Roudeau, P., Charm particle physics. A Tool-box for QCD, 17:32173 (R;FR;In French)
Heavy flavour physics at LEP, 17:32170 (R;FR)

Rouhiainen, V., *See* Haapakoski, M., 17:31118

Roush, M.L., *See* Farmer, F.G., 17:30759

Rousseau, L., *See* Dutton, L.M.C., 17:30895

Roussel-Dupre, D., Uniformity results of the multilayer mirrors used in the ALEXIS ultrasoft x-ray telescopes, 17:32055 (R;US)
See Bloch, J.J., 17:32054

Routbort, J.L., High-temperature deformation and diffusion in oxides, 17:31245 (R;US)
See Rothman, S.J., 17:31246

Rovnij, N., *See* Oliva, J.P., 17:31834

Rowland, J., *See* Grubelich, M.C., 17:31627

Roy, S., *See* Hnatowich, D.J., 17:31831
See Panda, S., 17:32089

Roze, V., Measurement of temporal variations in radon progeny working levels in mine atmospheres, 17:30617 (IA;CA)

Ruan Changgeng, *See* Wu Guoxin, 17:31858, 17:31871
See Zhou Quansheng, 17:31868

Ruch, R.R., *See* Chou, M.I.M, 17:30458

Rudolf, G., *See* Stuttge, L., 17:32280

Rudolph, A.S., *See* Phillips, W.T., 17:31815

Rue, H., *See* Myrheim, J., 17:32560

Ruhter, W.D., Recent improvements in plutonium gamma-ray analysis using MGA, 17:30776 (R;US)

Ruland, R., *See* Gaydosh, M., 17:31525

Rumyantsev, V.L., *See* Alekseev, V.L., 17:32380

Ruoff, A.L., Studies of the III-V compounds in the megabar regime: Technical progress report, 17:31222 (R;US)

Rupin, R., *See* Margaliot, M., 17:31926

Rupnik, D., *See* Mantica, P.F., 17:32245

Rusckowski, M., A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG, 17:31838 (RA;US)
See Hnatowich, D.J., 17:31830, 17:31831

Russel, W.B., Concentrated colloidal dispersions: Statistical mechanics, 17:31385 (RA;US)

Russell, K., *See* Taylor, M., 17:32519

Russkikh, V.N., *See* Ivanov, Y.B., 17:32304

Russo, P.A., *See* Sprinkle, J.K. Jr., 17:30760

Rusthol, D.P., *See* Johnson, K.F., 17:31513

Rutanen, V., Research needs on the natural gas field in Finland, 17:30592 (R;FI;In Finnish)

Ruth, T.J., *See* Chan, G.L.Y., 17:31845

Rutherfoord, J., [Elementary particle physics research]: Final report, [1 January 1991–31 January 1992], 17:32068 (R;US)

Rutherford, P.H., *See* Jardin, S.C., 17:32403

Ruyan, M., *See* Plotzke, K.P., 17:31784
See Schwendner, S.W., 17:31917

Ruyan, M.K., *See* DeForge, L.E., 17:31812, 17:31813

Ruzicka, V., Developments in uranium geology in Canada, 1985, 17:30606 (RA;CA)

Ryan, D., *See* Hoppe, M.L., 17:30428
See Koo, Sang-Man, 17:30429

Ryan, F., *See* Vandrish, G., 17:31558

Ryan, J.W., *See* Hay, R.V., 17:31892

Ryan, T.W. III, A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, April 15, 1989–July 14, 1989, 17:31153 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 July 1989–14 October 1989, 17:31154 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 October 1989–14 January 1990, 17:31155 (R;US)

Rykaer, S., *See* Schleisner, L., 17:31149

Ryman, J.C., *See* Faw, R.E., 17:31908

Ryon, M.G., *See* Southworth, G.R., 17:31726

S

Saadatmand, K., *See* Johnson, K.F., 17:31512

Saarelainen, J., The peat resources of the municipality of Juuka and their potentialities in fuel peat production. Part 1, 17:30488 (R;FI;In Finnish)
The peat resources of the municipality of Ilomantsi and their potentialities in fuel peat production. Part 1, 17:30496 (R;FI;In Finnish)
See Leino, J., 17:30508

Saarimaa, J., *See* Yrjoelae, J., 17:31113

Sabathier, F., *See* Beard, A.M., 17:30893

Sabbagh, S.A., *See* Nagayama, Y., 17:32434

Sabeh, M., The validation of horizontal well models using a physical model of heat flow in an anisotropic conductor, 17:30572 (R;US)

Sabot, R., *See* Dubois, M.A., 17:32458
Saccomanno, G., Incidence and development of lung cancer due to cigarette smoking and radiation exposure in uranium miners, 17:31942 (IA;CA)
See Paschoa, A.S., 17:31951
Sacks, R.A., *See* Moir, R.W., 17:32471
Sadanandan, N.D., Energy efficient motors reference guide: First edition, 17:31144 (R;US)
Sadoian, K.A., *See* Babayan, A.Z., 17:31499
Sady, W., An EPR spin probe method for characterizing changes in the accessible regions of coal upon oxidation, 17:30461 (R;US)
Saeki, M., *See* Naritomi, M., 17:31325
Saenko, A.S., *See* Smirnova, S.G., 17:31969
Saenko, V.A., *See* Borisov, O.N., 17:31489
Saez, D.G., *See* Borroto Valdes, M., 17:30782
Sagalovsky, L., Alternating-phase focusing: A model to study nonlinear dynamics, 17:31445 (R;US)
Segara, Kenji, *See* Koori, Norihiko, 17:32322
Sager, E.M., Contrast-enhanced computed tomography of the primary tumor in muscle invasive carcinoma of the urinary bladder, 17:31851 (I;NO)
Sagert, N.H., *See* Fluke, R.J., 17:31014
See Wren, J.C., 17:32574
Saghai, B., *See* Didelez, J.P., 17:32317
Sahlqvist, L., Seasonal storage of solar heating at Nynaeshamn, 17:30831 (R;SE;In Swedish)
Sailer, K., Fragmentation in the string-flux tube model, 17:32095 (IA;DE)
Sainio, E.O., *See* Yrjoelae, J., 17:31113
Saint Jores, P. De, A new radiation safety control system for Ganil, 17:31431 (R;FR)
Sajfulin, Sh.Z., *See* Tsambel, V., 17:31459
Sakasai, Akira, *See* Nagashima, Keisuke, 17:32428
Sakharov, E.M., *See* Kuz'min, R.N., 17:32427
Sakurai, Kiyoshi, *See* Nakazawa, Masaharu, 17:32320
Salamatin, L.I., *See* Buklanov, G.V., 17:31302
Salamy, S.P., *See* Overbey, W.K., 17:30588
Salcedo, L.L., *See* Garcia-Recio, C., 17:32230
Salmon, J.T., *See* Avicola, K., 17:32064
Salmonson, J.C., *See* Garcia, P., 17:31640
Salvadori, P.A., *See* Mariani, G., 17:31817
Samal, P., *See* Edwards, D.J., 17:32467
Samet, J.M., Studies of Grants, New Mexico, uranium miners, 17:31939 (IA;CA)
Sammells, A.F., Perovskite solid electrolytes for SOFC, 17:31080 (R;US)
Sampere, J.J.M., *See* Canellas, C.O., 17:31843
Sampson, T.E., *See* Sprinkle, J.K. Jr., 17:30768
Sanchez Bringas, F., Normal equivariant forms of vector fields, 17:32086 (R;XA;In French)
Sanchez, A., *See* Dewanjee, M.K., 17:31839
Sanchez, L.C., *See* Harmon, C.D., 17:30917
Sanctis, E. De, *See* Anghinolfi, M., 17:31530
Sandberg, J., *See* Soukas, A., 17:31477
Sanden, T., *See* Pusch, R., 17:30733
Sander, O.R., *See* Johnson, K.F., 17:31512, 17:31513
Sanders, J., *See* George, J.S., 17:31849
Sanders, T.H. Jr., *See* Jennings, T.L. Jr., 17:31217
Sandford, D.J., *See* Marshall, T.O., 17:31591
Sandin, C., Measurement of the removal sechtion of biological protection concretes in the spectrum of an AmBe source, 17:32343 (I;CU;In Spanish)
Sandness, G.A., A Remote Characterization System for subsurface mapping of buried waste sites, 17:30715 (R;US)
Sandness, G.R., *See* Noakes, M.W., 17:31353
Sandoval, D.P., *See* Johnson, K.F., 17:31512, 17:31513
See Wright, R.M., 17:31506
Sandri, P.L., *See* Anghinolfi, M., 17:31530
Sands, H., *See* Wessels, B.W., 17:31883
Sands, S., *See* Slovik, G.C., 17:31004
Sanford, W.E., *See* Surface, J.M., 17:31691
Sangas, D., *See* Balagurov, A.M., 17:32373
Sanipelli, G.G., *See* Kupferschmidt, W.C.H., 17:30943, 17:30944, 17:31339, 17:31340
Sann, H., *See* Mueller, W.F.J., 17:32291
Santiago, A.J., *See* Rathi, A.K., 17:31119
Santiago, H.T., *See* Wilbanks, T.J., 17:31049
Santos, J., *See* Castaneda Donate, S., 17:30939
Sanzone, M., *See* Anghinolfi, M., 17:31530
Sarao, R, *See* Sciocchetti, G., 17:31653
Sarapul'tsev, B.I., Evolutionary regularities formation of hierarchic system of genome reliability, 17:31979 (RA;SU;In Russian)
Sarff, J., *See* Hokin, S., 17:32413
Sarff, J.S., *See* Prager, S.C., 17:32412
Sarikov, N.A., Parameters of low-energy physics, radial excitations of π, K, D mesons and QCD potential, 17:32144 (R;SU)
See Amirkhanov, I.V., 17:32037, 17:32145
Sarria, P., *See* Sandin, C., 17:32343
Sartorius, S., *See* Baltes, P., 17:32297
See Senger, P., 17:32296
Sastry, K.S.R., *See* Harapanhalli, R.S., 17:31919
Sato, Hiroshi, Nucleus as a canonical ensemble, 17:32222 (IA;DE)
Sato, Isamu, *See* Kamitani, Takuya, 17:31538
Sato, K., *See* Kanazawa, M., 17:31498
Sato, O., *See* Momose, T., 17:31583
Sato, S., *See* Nishida, K., 17:30772
Satta, L., *See* Didelez, J.P., 17:32317
Sattler, M.L., *See* Yoo, C.S., 17:31283
Saunders, M., *See* Diaz Rizo, O., 17:31688
Savatores, M., *See* Nordborg, C., 17:30940
Savel'ev, A.E., *See* Gordelij, V.I., 17:32039
Savenko, B.N., *See* Balagurov, A.M., 17:32373
Savolainen, T., *See* Haapakoski, M., 17:31118
Savoy, C.A., *See* Traubenberg, M.R. de, 17:32071
Sawas-Dimopoulou, C., Elevated brain uptake of ^{59} citrate: Correlation with the critical period of brain development in experimental phenylketonuria, 17:31920 (RA;US)
Tissue localization of ^{125}I-Triiodothyronine in the periorbital area of mice: A microautoradiographic study, 17:31916 (RA;US)
See Castanheira, I., 17:31828
Saxen, B., Simulation of bioreactors: A literature review, 17:30800 (R;FI)
Saxen, H., Estimation of air flow profile based on state measurements, 17:31372 (R;FI)
Model for blast furnace on-line simulation. Part 4: Application of the model to prediction, 17:31198 (R;FI)
See Gustafsson, S., 17:31123
Saxena, A., *See* Bronold, F., 17:32361
Saxhof, B., *See* Abel, E., 17:31107
Sazonova, E.V., *See* Alimov, R., 17:31594
Scacco, F., *See* Sciocchetti, G., 17:31653
Scaroni, A., *See* Singh, S., 17:30552
Schaefer, A., *See* Rischke, D.H., 17:32220
See Sailer, K., 17:32095
Schanche, G., *See* Rapp, D.M. Ehrlinger, H.P., 17:30426
Scharf, H.D., *See* Patel, H.B., 17:31800
Schechter, *See* Balachandran, 17:32066
Scheffler, G.W., Advanced water-cooled phosphoric acid fuel cell development, 17:31082 (R;US)
Scheibling, F., *See* Stuttge, L., 17:32280
Scheinman, L., INF and IAEA: A comparative analysis of verification strategy: [Final report], 17:31197 (R;US)
Scherfig, J., *See* Schleisner, L., 17:31149
Schery, S.D., New capabilities for measurement of natural radioactivity using high purity N-type germanium detectors, 17:31565 (IA;CA)
Schicker, R., *See* Senger, P., 17:32296
Schidlowsky, W., *See* Meadley, T., 17:30613
Schiferl, R.F., *See* Dykhuizen, R.C., 17:32392
Schima, F.J., *See* Coursey, B.M., 17:31884
Schirber, J.E., *See* Assink, R.A., 17:32374
Schleisner, L., Energy problems in the opration of water treatment plants in cold periods: Phase 1 (1988-1990), 17:31149 (R;DK;In Danish)
Schlesinger, T., *See* Margaliot, M., 17:31650
Schlitt, H.A., *See* Gorodnitsky, I., 17:31850
Schmidt, L., *See* Psarros, N., 17:30641
Schmidt, M.W., *See* Glaeb, F., 17:30696

Schmidt, U.C., Quantitative determination of elements and identification of compounds of alkali halides by depth-sensitive secondary neutral mass spectrometry, 17:31303 (R;DE;In German)
Schmidtbauer, B., *See* Ekelund, T., 17:30859
Schmieden, H., *See* Andresen, H., 17:32261
Schmier, H., *See* Kompa, R., 17:31654
Schmirgeld, L., *See* Chaffron, L., 17:31249
Schmitt, J.J., *See* Halpern, B.L., 17:31081
Schneegans, M., High resolution crystal calorimetry at LHC, 17:31584 (R;FR)
Schneider, K.J., Foreign experience in extended dry storage of spent nuclear fuel, 17:30713 (R;US)
Schobert, H.H., *See* Huang, Lili, 17:30430
See Song, Chunshan, 17:30431
Schoenauer, H., Experience with the BEAMSCOPE emittance measurement system at the CERN PS Booster, 17:31495 (RA;JP)
Schoenfeld, D.H.W., *See* Cox, P.H., 17:31791
Schoenhofen, M., *See* Ivanov, Y.B., 17:32304
Schofield, C.J., *See* Chan, G.L.Y., 17:31845
Schomaecker, K., Tumortropic metal-complexes at the crossroads between diagnosis and therapy - A radiopharmacologic reflection, 17:31783 (RA;US)
See Shukla, S.K., 17:31786, 17:31810
Schreyer, H.L., *See* Hansen, N.R., 17:31242
See Neilsen, M.K., 17:32366
Schroer, B., The algebraic versus geometric approach to quantum field theory, 17:32113 (R;FR)
Schuettauf, A., *See* Mueller, W.F.J., 17:32291
Schuller, W.A., *See* Mroz, T.H., 17:30591
Schulman, N., *See* Mor, D., 17:31713
Schultz, D.C., *See* Clendenin, J.E., 17:31524
Schultz, J.M., Efficient domestic hot water heating, 17:31105 (R;DK;In Danish)
Insulating shutters, 17:31103 (R;DK;In Danish)
See Egelund Thomsen, K., 17:31099, 17:31102
Schulz, H., *See* Barz, H.W., 17:32301
Schurtz, G., *See* Andre, M., 17:32439
Schutz, Y., *See* Ostendorf, R., 17:32253
Schwab, E., *See* Senger, P., 17:32296
Schwalb, J.A., *See* Ryan, T.W. III, 17:31153, 17:31154, 17:31155
Schwartz, A.A., *See* Dunn, T.D., 17:30903
Schwartz, F.W., Cross-verification testing of fracture flow and mass transport codes, 17:31741 (R;SE)
Schwarz, R.K., Engineering Design Information System (EDIS) Information Services Division (ISD) Index Function: User's manual, 17:32575 (R;US)
Schweikert, E.A., *See* Benguerba, M., 17:32377
Schwendner, S.W., Enhancement of liver uptake of a radioiodinated triglyceride analog by prior incorporation into a lipoprotein-like emulsion, 17:31917 (RA;US)
See DeForge, L.E., 17:31813
Schwenterly, S.W., *See* Lubell, M.S., 17:31171
Schwerdtfeger, M., *See* Villegier, J.C., 17:31251
Schwieger, K, *See* Glaeb, F., 17:30696
Sciarrino, A., *See* Frappat, L., 17:32040
Scime, E., *See* Hokin, S., 17:32413
See Prager, S.C., 17:32412
Sciocchetti, G., Radiation monitoring program in Italian non-uranium mines, 17:31653 (IA;CA)
Sclesinger, T., Carcinogenic risks from exposure to non-ionizing radiation: Updated in accordance with the latest findings of the commitees ICRP, BEIR and UNSCEAR, 17:31925 (RA;IL;In Hebrew)
Patients protection during diagnosis and therapy with ionizing radiation: ICRO recommendations, 17:31929 (RA;IL;In Hebrew)
See Shanai, Y., 17:31928
See Thatcher, M., 17:31927
Scott, A.G., Recreating and measuring the underground environment of the late 1950's, 17:31717 (IA;CA)
Scott, H.A., *See* Wan, A.S., 17:31422
Scott, J.S., Introduction to transitional events workshop, 17:30652 (RA;CA)
Scott, S., *See* Plugge, M., 17:30774
Scripsick, R.C., Differences in 'in vitro' dissolution properties of settled and airborne uranium material, 17:31720 (IA;CA)
Secker, D.A., *See* Rosocha, L.A., 17:31662
Sedrakyan, A.G., Three-dimensional Ising Model and 2d-induced gravity, 17:32114 (R;FR)
Sefcik, J.A., Energy and Technology Review, April–May 1992, 17:31768 (R;US)
Seguchi, Tadao, *See* Kasai, Noboru, 17:30790
Sejling, K., Experiences gained in the use of prognoses for heat demand in Esbjerg, 17:31148 (I;DK;In Danish)
Seker, S., *See* Ciftcioglu, O., 17:30959
Seliskar, C.J., *See* Dosser, L.R., 17:31274
Selkowitz, S.E., *See* Brambley, M.R., 17:31117
Selle, J.E., Calculation of binary phase diagrams between the actinide elements, rare earth elements, and transition metal elements, 17:31238 (R;US)
Sellers, C.H., The influence of processing atmosphere on twin-roll melt-spinning of aluminum alloys, 17:31228 (R;US)
Sellin, P., Proceedings from the technical workshop on near-field performance assessment for high-level waste, 17:30723 (R;SE)
See Pusch, R., 17:31733
Selvaraj, S., *See* Qi, P., 17:31833
Semenciw, R.M., *See* Morrison, H.I., 17:31937
Semerdzhyan, S.P., *See* Atayan, R.R., 17:31958
Semmes, P., *See* Garg, U., 17:32242
Sene, M.R., *See* Bailey, M., 17:30689
Senger, P., Particle production at SIS energies and the nuclear equation of state, 17:32296 (IA;DE)
Sengupta, S., *See* Shi, Donglu, 17:31247
Senoussi, S., *See* Chaffron, L., 17:31249
Serafini, A.N., *See* Dewanjee, M.K., 17:31801, 17:31821, 17:31839, 17:31840, 17:31841, 17:31842, 17:31913, 17:31921
Serezhnikov, S.V., *See* Kopeikin, I.N., 17:30966
Sergeenko, M.N., *See* Lykasov, G.I., 17:32111
Sergeev, A., Nonlinear shaping of a two-dimensional ultrashort ionizing pulse, 17:32409 (R;SE)
Seright, R.S., Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report, 17:30567 (R;US)
Serkiz, Ya.I., *See* Antonenko, S.G., 17:31984, 17:31985
Sethi, V., *See* Merriam, N., 17:30421
Sevan'kaev, A.V., *See* Pozdyshkina, O.V., 17:31970
Sezgin, E., Nonlinear realisations of $\omega_{1+\infty}$, 17:32076 (R;XA)
Sfakianakis, G.N., *See* Dewanjee, M.K., 17:31801, 17:31821, 17:31839, 17:31840, 17:31841, 17:31842, 17:31913, 17:31921
Shabanov, S.V., *See* Prokhorov, L.V., 17:32107, 17:32109
Shack, W.J., *See* Park, J.Y., 17:30653
Shadman, F., Mechanism of surface enrichment and adhesion of coal combustion particulates: First quarterly report, February 1987, 17:30548 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
Shafer, R.E., *See* Wells, F.D., 17:31510
Shaffer, C.J., *See* Payne, A.C. Jr., 17:31023
Shahbagian, R.R., *See* Lobanov, Yu.Yu., 17:32552
Shahbazian, B.A., Multiquark stable and metastable states, 17:32329 (RA;SU)
Shakun, N.G., *See* Onishchenko, L.M., 17:31457
Shamir, Y., Compensating fields and anomalies in supergravity, 17:32080 (R;XA)
Shams, K.G., Enhancing low severity coal liquefaction reactivity using mild chemical pretreatment: Quarterly technical progress report, December 1991–February 1992, 17:30455 (R;US)
Shen Ruixia, *See* Fu Zhujun, 17:31349
Shanai, Y., Radon - its concentrations and hazards in the world and in Israel, 17:31928 (RA;IL;In Hebrew)
Shanbaky, N.M., *See* Emran, A.M., 17:31772
Sheng Zhenkui, *See* Duan Shuyun, 17:32401
Shapira, D., *See* Ray, A., 17:32276
Shapiro, C., Idaho National Engineering Laboratory response to the December 13, 1991, Congressional inquiry on offsite release of hazardous and solid waste containing radioactive materials from Department of Energy facilities, 17:30663 (R;US)
Sharma, H.L., *See* Zweit, J., 17:31844

Sharma, M.M., The surface compression of nuclei in relativistic mean-field approach, 17:32232 (R;FR)
Shaviv, G., *See* Starrfield, S., 17:32059, 17:32060
Shaw, R.A., *See* Suter, G.W. II, 17:31699
Shcheglov, V.S., *See* Belyaev, I.Ya., 17:31957
Shcheulov, A.S., *See* Zhabitskij, V.M., 17:31535
Shea, T.J., *See* Blaskiewicz, M., 17:31474
Shearer, T.W., A model for electron and beta energy deposition within trabecular bone, 17:31895 (RA;US)
Sheeran, C.T., Evaluation of a microcomputer system for controlling and monitoring radiation hazards in uranium mines, 17:30631 (IA;CA)
Sheldon, R.I., *See* Lawson, A.C., 17:32041
Shelkova, I.G., *See* Pokotilovskij, Yu.N., 17:32346
Shelton, R.N., *See* Lan, M.D., 17:31264
Shelton, W.A., *See* Stocks, G.M., 17:31215
Shen Qingping, *See* Tian Jian, 17:30884
Shen, W., *See* Hokin, S., 17:32413
See Prager, S.C., 17:32412
Shen, Weimin, Measurement of current density fluctuations and ambipolar particle flux due to magnetic fluctuations in MST, 17:32411 (R;US)
Sheng Xianke, *See* Qu Jiadi, 17:30880
Sheng-De, W., *See* Ri-Kai, W., 17:31564
Shepard, W.S., Diagnostic development and support of MHD test facilities: Technical progress report, July–September 1990, 17:31077 (R;US)
Shephard, J.R., *See* Rost, E., 17:32206
Sheppard, J.C., *See* Clendenin, J.E., 17:31524
Shepperd, M.G., *See* Freeman, B.L., 17:31636
Sheridan, T., Utilization of databases to manage resources, 17:31473 (R;US)
Sherwood, P.M.A., *See* Gaarenstroom, S.W., 17:31143
Sheth, A.C., Anion-exchange resin-based desulfurization process: Quarterly technical progress report, April 1, 1992–June 30, 1992, 17:30864 (R;US)
Shevchenko, L.V., Two-flux Monte Carlo approach to electron diffusion in solids, 17:32345 (R;SU)
Shi Fuxi, *See* Zhu Shoupeng, 17:31854
Shi, Donglu, Activation energy and critical current density in Bi-Sr-Ca-Cu-O, 17:31247 (R;US)
Shibaev, V.D., *See* Barabash, I.P., 17:31616
Shier, W., Single failure effects on surge line break transients for the VVER-440 reactor, 17:30999 (R;US)
See Horak, W.C., 17:30998
Shih, H.J., Longitudinal beam dynamics with rf noise, 17:31468 (R;US)
Shiloni, Y., *See* Vulkan, U., 17:31710
Shimomura, Yasuo, *See* Murakami, Yoshiki, 17:32463
Shin, Y., *See* Senger, P., 17:32296
Shipers, L.R., *See* Harmon, C.D., 17:30917
Shiraishi, H., Measurement on the rate of some reactions relevant to iodine chemistry in the aqueous phase, 17:31327 (RA;JP)
Shirkov, G.D., Calculation of ion charge-state distributions in ECR ion sources, 17:31490 (R;SU;In Russian)
Shishdyannikov, P.T., *See* Onishchenko, L.M., 17:31457
Shishkin, A.L., *See* Onishchenko, L.M., 17:31457
Shnir, Ya.M., Dielectric and magnetic permittivities of the QED vacuum caused by dyon, 17:32133 (R;XA)
Shore, S.N., *See* Starrfield, S., 17:32058
Showalter, W.E., Cost performance assessment of in situ vitrification, 17:30706 (R;US)
Shprints, Kh., *See* Kuropteva, Z.V., 17:31978
Shugart, L.R., The use of biomarkers to assess environmental health, 17:31692 (R;US)
Shukla, S.K., From pure radionuclide species in solution through pure radiopharmaceuticals and simple radiopharmacology to disease-specific nuclear medicine, 17:31810 (RA;US)
Tumor-specific Y-90 species in solution for animal and human tumor therapy, 17:31786 (RA;US)
See Schomaecker, K., 17:31783
Shultis, J.K., *See* Faw, R.E., 17:31897
Shum, D.K.M., *See* Theiss, T.J., 17:31218
Shurberg, D.A., Organizational culture during the accident response process, 17:31000 (R;US)
Shvilkin, B.N., *See* Kuz'min, R.N., 17:32427
Shyka, C., *See* Billinghurst, M.W., 17:31779
Siddall, P., South Fork Clearwater River habitat enhancement - Nez Perce National Forest, 17:30818 (R;US)
Sidikman, K.L., *See* Prager, S.C., 17:32412
Siebers, D.L., *See* Dec, J.E., 17:31157
Siebert, R., Meson physics at Saturne, 17:32162 (R;FR)
See Didelez, J.P., 17:32317
Siemens, P.J., *See* Xia Linhua, 17:32225
Siemer, D.D., Laboratory studies of the behavior of undissolved solids in both pulsed and packed column extraction systems, 17:31308 (R;US)
Silady, F.A., *See* Dunn, T.D., 17:30903
Silen, P., *See* Leino, J., 17:30490
Siler, J.L., Remediating biofouling of reverse osmosis membranes, 17:31367 (R;US)
Sillanpaeae, M., Model for predicting the evolution of steel temperature in a continuous casting tundish on the basis of expert knowledge, 17:31199 (R;FI)
See Saxen, H., 17:31372
Silva, A.C.F., *See* Melo, I.S., 17:31923
Silva, S.R. da, *See* Borghi, V.C., 17:31853
Silver, M., Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30823 (R;US)
Silvestre, P., *See* Beaudoing, G., 17:30655
Simmons, M.L., *See* Lubeck, O.M., 17:32556
Simon, R.S., *See* Kugler, A., 17:31566
Simonen, F.A., *See* Doctor, S.R., 17:30921, 17:31022
Simonen, T.C., Future development of the DIII-D tokamak program, 17:32459 (R;US)
Sims, C.S., The status of ANSI N13.11 - The dosimeter performance test standard, 17:31587 (RA;US)
See Buckner, M.A., 17:31590
Sims, H.E., *See* Barton, R.A., 17:30894
See Wren, J.C., 17:32574
Singer, R.M., *See* Delpech, M., 17:30901
Singh, N.P., Concentrations of ^{210}Pb in uranium miners' lungs and its state of equilibria with ^{238}U, ^{234}U, and ^{230}Th, 17:31949 (IA;CA)
See Paschoa, A.S., 17:31951
Singh, S., Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992, 17:30552 (R;US)
Singleton, M.F., *See* Aldis, D.F., 17:30602
See Wallman, P.H., 17:30460
Sisakyan, A.N., Intermittency in the limit of a large number of correlated components, 17:32032 (R;SU;In Russian)
Sisk, E.C., *See* Zimbrick, J.D., 17:31996
Sitbon, R., *See* Bottlaender, M., 17:31798
Sivriev, I.K., *See* Bonev, M.N., 17:31965
Sixt, R., *See* Vestergren, E., 17:31904
Sizov, I.V., *See* Poyarkov, V.A., 17:32334
Sjoestroem, K., *See* Bjoerklund, R.B., 17:30804
Skaarup, S., Electrode materials for solid state batteries, 17:31044 (I;DK;In Danish, English)
Skachkov, N.B., *See* Dvoeglazov, V.V., 17:32142, 17:32194
Skinner, L.H., *See* Gauthier, J.H., 17:30717
Skinner, R.W.S., *See* Plotzke, K.P., 17:31784
See Schwendner, S.W., 17:31917
Skjevling, G., *See* Bugge, L., 17:31598
Skobelev, N.K., *See* Luk'yanov, S.M., 17:31576
Skocypec, R.D., *See* Dykhuizen, R.C., 17:32392
Skowronek, J., *See* Lebecka, J., 17:31722
Skubacz, K., *See* Lebecka, J., 17:31722
Skulski, M.S., *See* Patel, H.B., 17:31800
Skuratov, V.A., *See* Goleminov, N.G., 17:31604
Slavin, A., *See* Sullivan, J.D., 17:32445
Slegers, G., *See* Lambert, F., 17:31835
Slentz, G., *See* Stettler, M., 17:31508
Slepchenko, L.A., *See* Sisakyan, A.N., 17:32032
Slinkin, M., *See* Danilov, S., 17:31788
Slobben, J., *See* Pijlgroms, B.J., 17:32517

Slovik, G.C., Assessment of prism responses to loss of flow events, 17:31004 (R;US)
Sluiter, M., *See* Stocks, G.M., 17:31215
Smaga, J.A., *See* DeLuca, W.H., 17:31043
Smalinskas, K., A study of the vacancy loop formation probability in Ni-Cu and Ag-Pd alloys, 17:31202 (R;US)
Smart, B.C., *See* Napier, W.A., 17:31945
Smartt, H.B., *See* Taylor, P.L., 17:31358
Smidt, S.M., *See* Chaiko, D.J., 17:31310
Smirnov, Yu.S., *See* Zhanlav, T., 17:32553
Smirnova, S.G., Regularities of DNA synthesis repair in populations of irradiated mammalian cells, 17:31969 (RA;SU;In Russian)
Smith, B., HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)
Smith, B.F., *See* Rogers, Y.C., 17:31305
Smith, B.W., *See* Bloch, J.J., 17:32054
Smith, D.C., *See* Allison, D.K., 17:31035, 17:31037
See Geiger, G.T., 17:31033
Smith, F.W., *See* Smith, T., 17:31773
Smith, G.T., Dynamic PET scanning and compartmental model analysis to determine cellular level radiotracer distribution in vivo, 17:31900 (RA;US)
See Stubbs, J.B., 17:31901
Smith, H.V. Jr., Suppression of the e^- coextracted from a Penning surface-plasma H^- source, 17:31509 (R;US)
Smith, J. Jr., Cryogenic refrigeration for Maglev requirements and opportunities, 17:31172 (RA;US)
Smith, J.D., *See* Rosocha, L.A., 17:31662
Smith, J.G., *See* Southworth, G.R., 17:31726
Smith, K.P., Waste minimization in the oil and gas industries, 17:30578 (R;US)
Smith, L.L., Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)
Smith, M., *See* Shi, Donglu, 17:31247
Smith, M.L., Test results for Supplement A to Production Test IP 358 AC, 17:30989 (R;US)
Smith, P.A., *See* Frick, U., 17:31729
Smith, R., Lightning threat warning system at the Tonopah Test Range, 17:31639 (R;US)
Smith, R.D., *See* Light-Wahl, K.J., 17:31764
See Loo, J.A., 17:31765
See Ogorzalek Loo, R.R., 17:31762
See Wahl, J.H., 17:31763
Smith, R.H., *See* Hauff, T.W., 17:30990
Smith, R.W., *See* Castro, R.G., 17:31258
Smith, S.E., *See* Sprinkle, J.K. Jr., 17:30760
Smith, T., Dosimetry of ^{99m}Tc-P53, a new myocardial perfusion imaging agent, 17:31773 (RA;US)
Smither, R.K., Thermal imaging of synchrotron beams on silicon crystals, 17:31470 (R;US)
Smoot, L.D., *See* Brewster, B.S., 17:30542
Snell, W., METD: Computer code systems to use with meteorological data, 17:32548 (CM;US)
METD: Computer code systems to use with meteorological data, 17:32549 (CM;US)
Snellman, M., *See* Pitkaenen, P., 17:30752
Snow, S.L., Nickel plating of flexible products: Statistical optimization, 17:31414 (R;US)
Snyder, J., *See* Brambley, M.R., 17:31117
Soares, C., *See* Zeman, G.H., 17:31588
Soderholm, S.C., *See* Scripsick, R.C., 17:31720
Sodnom, N., *See* Gehrbish, Sh., 17:31301
Soffer, L., Iodine chemical form in LWR reactor accidents: Regulatory perspectives in the United States, 17:30919 (RA;JP)
Sofianos, S.A., *See* Adam, R.M., 17:32231
Sokol, E.A., *See* Luk'yanov, S.M., 17:31576
Soleng, H.H., *See* Groen, Oe., 17:32127
See Jensen, B., 17:32126
Solin, R., *See* Jokioinen, I., 17:31136
Solomnikov, V.P., *See* Akhmanov, V.V., 17:31492
Solomon, A.D., Latent heat thermal energy storage for lunar oxygen production, 17:31042 (R;US)
Solomon, P.R., *See* Brewster, B.S., 17:30542
Solomon, S.B., *See* Mason, G.C., 17:31955
See O'Brien, R.S., 17:30614
Solov'ev, V.G., *See* Kuz'min, V.A., 17:32250
Somasundaram, S., An overview of heat exchanger enhancement techniques for industrial applications, 17:31142 (R;US)
Song Wenhui, Analysis and evaluation of the in-pile irradiation test of the fuel element for Qinshan Nuclear Power Plant, 17:30882 (R;CN;In Chinese)
Song, Chunshan, Temperature-programmed liquefaction of low-rank coals in H-donor and non-donor solvents, 17:30431 (R;US)
See Huang, Lili, 17:30430
Song, J., Numerical dispersion reduction by correction of mass flows. Application to the problem of hydrocarbon recovery by chemical processes, 17:30573 (R;FR;In French)
Soppe, W.J., Jain-Lidiard model calculations of radiation damage in sodium chloride: Presented at the Conference REI'6 (Radiation Effects in Insulators-6), June 24-28, 1991, Weimar, Germany, 17:31271 (R;NL)
Soppet, W.K., *See* Park, J.Y., 17:30653
Sorella, S.P., *See* Maggiore, N., 17:32117
Sorenson, K., Transportation Assessment and Integration (TRAIN): A basis for planning DOE transportation in the 1990s: Final report, 17:31065 (R;US)
Sorenson, K.B., *See* Stephens, J.J., 17:31240
Soroko, L.M., Inverse meso-optics and its potential applications, 17:31569 (R;SU)
The technique for measuring of the dip angle of the straight particle tracks in the nuclear emulsion by means of the meso-optical Fourier transform microscope, 17:31567 (R;SU;In Russian)
Soukas, A., Operational status of the AGS Booster Main Ring Magnet Power Supply, 17:31477 (R;US)
Soulat, P., Effect of a sustained load and a low loading rate on 16 MND5 steel ductile tearing resistance, 17:31207 (R;FR;In French)
See Marini, B., 17:31209
Soulpi, K., *See* Sawas-Dimopoulou, C., 17:31920
Sousa, D.C., *See* Toth, K.S., 17:32213, 17:32244
Southworth, G.R., Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)
See Walter, K.A., 17:30746
Souto, D., *See* Verdera, S., 17:31823
Soyeur, M., *See* Xia Linhua, 17:32225
Spall, W.D., *See* Rogers, Y.C., 17:31305
Spangler, E.M., *See* Woods, C.M., 17:31632
Spanner, J.C., *See* Doctor, S.R., 17:30921, 17:31022
Sparks, W.M., *See* Starrfield, S., 17:32059, 17:32060
Spears, D.R., *See* Sady, W., 17:30461
Spencer, B.W., *See* Gabor, J.D., 17:30997
Spencer, J.E., Test of QED using a laser at the SLAC final focus test beam, 17:32184 (R;US)
Spencer, R.P., *See* Patel, H.B., 17:31800
Spengler, C.J., *See* Ray, E.R., 17:31083
Sperl, G.T., *See* Sperl, P.L., 17:30447, 17:30448, 17:30449, 17:30450, 17:30451
Sperl, P.L., Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991, 17:30447 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991, 17:30448 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)
Speth, J., *See* Mull, V., 17:32226
Spicer, K.M., *See* Cheng, K.T., 17:31836
Spindler, D.D., Simultaneous saccharification and fermentation (SSF) using cellobiose fermenting yeast Brettanomyces custersii (CBS 5512), 17:30807 (PA;US)
Sprenger, M., *See* Andresen, H., 17:32261
Sprinkle, J.K. Jr., A miniature modular multichannel analyzer system for automated, low- resolution gamma-ray spectroscopy, 17:30760 (R;US)
The in-plant evaluation of a uranium NDA system, 17:30768 (R;US)

See Rinard, P.M., 17:30709
Sprott,, *See* Prager, S.C., 17:32412
Sprott, C., *See* Hokin, S., 17:32413
Stab, L., *See* Hourani, E., 17:32248
Stabin, M.G., An alternative to convolution integrals for radiation absorbed dose calculations, 17:31905 (RA;US)
Prediction of radiation dose to the GI tract from analysis of blood and liver time-activity curves, 17:31888 (RA;US)
Radiation dosimetry for Tc-99m MAG3 in adults and children, 17:31903 (RA;US)
See Stubbs, J.B., 17:31901
Stachel, J., Baryon and pion distributions from nucleus-nucleus collisions at 15 GeV/nucleon, 17:32287 (IA;DE)
Staebler, G.M., *See* Allen, S.L., 17:32474
Staicu, V., *See* De Blasi, F.S., 17:32083
Stambaugh, R., *See* Allen, S.L., 17:32474
Stanek, P.W., *See* Castro, R.G., 17:31258
Stanev, Y.S., *See* Furlan, P., 17:32026
Staniforth, D., *See* Findlay, D.J.S., 17:30688
Stapp, H.P., Quantum theory and the emergence of patterns in the universe, 17:32042 (R;US)
Starinski, A., *See* Harlavan, Y., 17:31703
Starinsky, A, *See* Vangosh, A., 17:31706
Starinsky, A., Evidence for the origin of Ca in land snails living on basalts (Golan Heights) from their strontium isotopic composition, 17:31714 (IA;IL)
See Herut, B., 17:31704, 17:31705
See Tzur, D., 17:31709
See Vengosh, A., 17:31715
Stark, V.J., *See* Hay, R.V., 17:31892
Starke, C., *See* Glaeb, F., 17:30696
Starr, J.W., *See* Douglas, D.G., 17:30645
Starrfield, S., ^{22}Na and ^{26}Al production in nova outbursts, 17:32060 (R;US)
Nucleosynthesis in nova explosions, 17:32059 (R;US)
Ultraviolet studies of novae in the large magellanic cloud, 17:32058 (R;US)
Stassi, P., *See* Desesquelles, P., 17:32268
Stathaki, S., *See* Cotsyfakis, C., 17:31794
See Papadopoulos, M., 17:31782
Staudenherz, A., *See* Leitha, T., 17:31802, 17:31814
Staudhammer, K., Materials compatibility and corrosion issues for accelerator transmutation of waste, 17:30704 (R;US)
Stearns, D.G., *See* Rosen, R.S., 17:31244
Stecher-Rasmussen, F., *See* Freudenreich, W.E., 17:31848
See Voorbraak, W.P., 17:31550
Steckmeyer, J.C., *See* Stuttge, L., 17:32280
Steele, R. Jr., Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility), 17:30993 (R;US)
Steenhuis, T.S., *See* Surface, J.M., 17:31691
Stefannski, P., *See* Bartke, J., 17:32293
Stefanski, R., *See* Murphy, C.T., 17:31443
Stefec, R., *See* Bouska, P., 17:31230
Steffens, K.H., *See* Andresen, H., 17:32261
Stein, J., *See* Senger, P., 17:32296
Steinel, A., *See* Andresen, H., 17:32261
Steinhausler, F., Comparative tests of radon and radon daughter detection systems under simulated environmental conditions, 17:31552 (IA;CA)
Inherent dosimetric and epidemiological uncertainties associated with lung cancer risk assessment for mining populations, 17:31933 (IA;CA)
Steinitz, G., *See* Harlavan, Y., 17:31703
See Mor, D., 17:31713
See Tzur, D., 17:31709
See Vulkan, U., 17:31710
Stekly, J., An integrated approach to develop conductors, coils, cryogenic system, on-board magnet assembly, 17:31178 (RA;US)
Stelle, K.S., *See* Sezgin, E., 17:32076
Sten, C.G., Inventory of mires and peat resources, Parkano, Western Finland. Part 1, 17:30504 (R;FI;In Finnish)
The peat resources and their potential use in Kihnioe, Western Finland, 17:30506 (R;FI;In Finnish)
Stenflo, L., *See* Sergeev, A., 17:32409
Stensland, G., Petroleum taxation and the incentives for exploration and development, 17:30575 (R;NO)
Stepanov, V.E., *See* Kopeikin, I.N., 17:30966
Stephens, J.J., Elevated temperature tensile properties of borated 304 stainless steel: Effect of boride dispersion on strength and ductility, 17:31240 (R;US)
Stern, R.J., Sr and Nd isotopic constraints on the evolution of the Har Timna igneous complex, southern Israel, 17:31707 (IA;IL)
Stettler, M., A distributed timing system for sychronizing control and data correlation, 17:31508 (R;US)
Stevens, R.R., *See* Johnson, K.F., 17:31512, 17:31513
Stewart, A.J., *See* Southworth, G.R., 17:31726
Stewart, H., *See* Taylor, M., 17:32519
Stickler, L.A., Study of wall heat transfer from a high temperature dissociated hydrogen impinging jet, 17:31160 (R;US)
Stinchcomb, W.W., Investigation of properties and performance of ceramic composite components, 17:31260 (R;US)
Stock, R., *See* Senger, P., 17:32296
Stocker, H., *See* Morrison, H.I., 17:31937
Stocks, G.M., Ordering energies and mechanisms in β-phase NiAl, 17:31215 (R;US)
Stoecker, H., *See* Rischke, D.H., 17:32220
Stoeckle, K., PMAS4.0: Performance Measurement Analysis System, 17:32520 (CM;US)
Stollar, R.L., *See* Koziar, G., 17:30589
Stoltz, D.L., Miscellaneous Waste Stream strategy document, 17:30703 (R;US)
Stoltz, L.A., GNETS: Graphical Network Security system user guide, 17:32555 (R;US)
Stoneking,, *See* Hokin, S., 17:32413
Stoots, C.M., *See* McEligot, D.M., 17:31388, 17:31389
Storms, E.K., Measurements of excess heat from a Pons-Fleischmann type electrolytic cell using palladium sheet, 17:32432 (R;US)
Stoyer, C.H., *See* Hoekstra, P., 17:30561
Straehle, A., *See* Gale, J., 17:31745
Strachan, N.R., *See* Findlay, D.J.S., 17:30688
Strandberg, J., Optimizing of a photovoltaic system for supplying a residential with electricity, 17:30824 (R;SE)
Stranden, E., A passive integrating radon dosimeter combining activated charcoal and TLD, 17:31563 (IA;CA)
Thoron daughter to radon daughter ratios in mines, 17:31657 (IA;CA)
Stratton, R.C., *See* Brambley, M.R., 17:31117
Straub, G.K., The electronic structure of core states under extreme compressions, 17:32364 (R;US)
Straub, M., *See* Andresen, H., 17:32261
Strel'tsov, V.N., Relativity theory in (2+2)-space, 17:32030 (R;SU)
Some problems of relativistic electrodynamics, 17:32106 (R;SU)
Strenge, D.L., SUBDOSA: External dose airborne radionuclides, 17:32535 (CM;US)
See Houston, J.R., 17:32536
Strevel, S.D., *See* Sheth, A.C., 17:30864
Strickland, R., *See* Rapp, D.M. Ehrlinger, H.P., 17:30426
Stroebele, H., *See* Senger, P., 17:32296
Stroemberg, A.M., Prospects for further development of spray-dry scrubbing, 17:30867 (R;SE)
Strokach, A.P., *See* Grigorenko, S.V., 17:31518
Strokovsky, E.A., *See* Gareev, F.A., 17:32256
Strong, J.C., *See* Dixon, D.W., 17:31719
Strugalski, Z., Hadrons in statu nascendi, 17:32323 (R;SU)
Stubbins, J.F., *See* Garner, F.A., 17:32466
Stubbs, J.B., A new mathematical model of gastrointestinal transit incorporating age- and gender-dependent physiological parameters, 17:31890 (RA;US)
An approach to cellular level dosimetry using compartmental model analysis and dynamic PET, 17:31901 (RA;US)
See Emran, A.M., 17:31772
See Smith, G.T., 17:31900
Stucki, J.W., *See* Chou, M.I.M, 17:30458
Stuka, B., Experiments to study the erosive effect of oxide casting streams on structures, 17:31234 (R;DE;In German)
Stulzaft, O., *See* Loc'h, C., 17:31796

Stupakov, G., *See* Lebedev, V., 17:31469

Stuttge, L., Energy damping and intermediate velocity fragment emission in peripheral Kr+Au collisions at 43 MeV/u, 17:32280 (R;FR)

Su Liaoyuan, *See* Liu Keliang, 17:31872

See Xu Yujie, 17:31874

Suarez, J.A., Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)

Suarez, J.C., *See* Cruz Inclan, C., 17:31252

Subba Ramu, M.C., A study of the dose conversion factors for inhalation risk assessment from radon daughters in mine atmospheres, 17:30618 (IA;CA)

Sudati, F., *See* Paganelli, G., 17:31816

Sudo, S., Study on collection of resource evaluation bases in the northern Tohoku district (Akita-Koma).: Geological survey of Tashirodake and Tara-Komagadake areas, 17:30835 (IA;JP;In Japanese)

Sugihara, Masayoshi, *See* Murakami, Yoshiki, 17:32463

Suib, S.L., Structure sensitive reactions over Co, Fe and mixed metal clusters in zeolites: Annual technical progress report, 17:31314 (R;US)

Sukiennicki, B., *See* Bulos, F., 17:31522

Sulku, J., Remote supervision systems in communes, 17:31114 (R;FI;In Finnish)

Sullivan, J.D., Canadian ceramic breeder sphere-pac technology: Capability and recent results, 17:32445 (R;CA)

Sumitani, Hiroaki, Calculations of LINAC spectrum characteristics using EGS4, 17:31503 (RA;JP;In Japanese)

Sumiyoshi, T., *See* Ida, H., 17:31502

Summer, N.S., Stable isotope geochemistry of dike/Inmar sandstone contact zones, Makhtesh Ramon, Israel, 17:31708 (IA;IL)

Sumpter, B.G., *See* Darsey, J.A., 17:31312

Sun Baofu, *See* Zhu Shoupeng, 17:31877

Sun Shuyun, *See* Zhang Qinfen, 17:30638

Sunnevaag, K., *See* Stensland, G., 17:30575

Suomi, T., The mires and peat resources of the commune of Isokyroe and their potential use. Part 1, 17:30498 (R;FI;In Finnish)

The mires and their potentialities in peat production in the municipality of Ilomantsi, 17:30513 (R;FI;In Finnish)

Suomijaervi, T., *See* Chomaz, Ph., 17:32219

Suranyi, G., *See* Muller, J., 17:31934

Suresh, S., [High temperature fatigue crack growth in ceramics and ceramic composites]: [Annual report, August 1991–July 1992], 17:31255 (R;US)

Surface, J.M., Effect of season, substrate composition, and plant growth on landfill leachate treatment in a constructed wetland, 17:31691 (R;US)

Surovtsev, Yu.S., Inverse pion electroproduction at high energies- a source of information on the hadron form factors, 17:32196 (R;SU)

See Meshcheryakov, V.A., 17:32166

Suter, G.W. II, Approach and strategy for performing ecological risk assessments for the Department of Energy Oak Ridge Field Office Environmental Restoration Program: Environmental Restoration Program, 17:31699 (R;US)

Suuberg, E.M., A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)

Suzuki, Shuichi, *See* Kobayashi, Fumiaki, 17:30991

Svahnbaeck, L., *See* Sten, C.G., 17:30504

Svedberg, G., *See* Warnquist, B., 17:31139

Svistunov, Yu.A., *See* Grigorenko, S.V., 17:31518

Swain, G.R., Linac beam dynamics calculations for low-current large-emittance beams, 17:31461 (R;US)

Sweatt, W.C., Optimization of a VISAR for measuring flyer-plate velocities, 17:31634 (R;US)

Swettenham, S.S., *See* Charbonneau, B.W., 17:30607

Swift, G.W., New technologies for refrigeration without CFCs, 17:31133 (R;US)

Swinhoe, M.T., *See* Bailey, M., 17:30689

Swinson, W.F., Fuel plate stability experiments and analysis for the Advanced Neutron Source, 17:30973 (R;US)

Sykes, T.R., Behavior of various radiochemical species present in Tc-99m labeled monoclonal antibody preparations, 17:31811 (RA;US)

Preliminary studies on the metabolism of Tc-99m MAb-170, 17:31805 (RA;US)

See Qi, P., 17:31833

Synzynys, B.I., *See* Smirnova, S.G., 17:31969

Sype, T.T., *See* Payne, A.C. Jr., 17:31023

Szabo, J., *See* Janoki, Gy.A., 17:31804

Szalata, Z.M., *See* Whitlow, L.W., 17:32183

Szotek, Z., *See* Stocks, G.M., 17:31215

Szpunar, C.B., Characterization of selected countries, 17:30555 (RA;US)

Comparative analyses of potential markets, 17:30556 (RA;US)

Identification of likely market niches, 17:30558 (RA;US)

Implications for the US Department of Energy's Clean Coal Technology Demonstration Program, 17:30559 (RA;US)

Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)

Status of the US Department of Energy's Clean Coal Technology Demonstration Program, 17:31071 (RA;US)

Technology descriptions and demonstrations, 17:30419 (RA;US)

Trade-related issues and barriers, 17:30557 (RA;US)

Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

T

Tagawa, H., *See* Karasawa, H., 17:31326

Taglia, L., *See* Shukla, S.K., 17:31786, 17:31810

Taibi, I., Intelligent perception control based on a blackboard architecture, 17:31347 (R;FR)

Taiuti, M., *See* Anghinolfi, M., 17:31530

Takacs, P.Z., *See* Irick, S.C., 17:31516

Takahashi, Akito, *See* Kawade, Kiyoshi, 17:32321

Takahashi, M., Basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map 'Niigata', 17:30836 (IA;JP;In Japanese)

See Karasawa, H., 17:31326

See Noda, T., 17:30851

Takahashi, Tomoyuki, International Atomic Energy Agency cooperated research programme on the safety assessment of near-surface radioactive waste disposal facilities (NSARS): Results for Test Case 1 (earth trench case), 17:30702 (R;JP)

Takakura, S., *See* Ogawa, Y., 17:32010

Takamuku, K., *See* Gotoh, S., 17:31259

Takeuchi, Y., *See* Ida, H., 17:31502

Talmor, A., Estimation of population expected exposure as a result of mining in Sde Zohar field, 17:31665 (R;IL;In Hebrew)

Tamao, S., Comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data, 17:30843 (IA;JP;In Japanese)

See Takahashi, M., 17:30836

See Yamaguchi, Y., 17:30833

Tammela, P.T., *See* Carlsten, S., 17:31737

Tamosiunas, G., *See* Verdera, S., 17:31823

Tanabe, Fumiya, *See* Watanabe, Tadashi, 17:31394

Tanaka, Shun-ichi, Calculations of bremsstrahlung photon spectrum from β-ray radioisotopes, 17:31580 (RA;JP;In Japanese)

Tang Bo, *See* Li Rizhu, 17:31381

Tang Yiru, Preparation of uranium dioxide powder: Process for production coarse particle ADU precipitate in pilot plant, 17:30634 (R;CN;In Chinese)

Tang Zaimin, An elevator for cobalt-60 source, 17:30784 (R;CN;In Chinese)

Tang, M.S.H., *See* Canfield, T.R., 17:31265

Tanke, E., *See* Valero, S., 17:31452

Tanskanen, E., *See* Maentylae, K., 17:31089

Tanzman, E.A., Constitutional and legal implications of arms control verification technologies, 17:31195 (R;US)

Tao Feng, Placental and milk transfer as well as distribution of ^{147}Pm in mouse, 17:31870 (R;CN;In Chinese)

Study on the dose models of ^{147}Pm in tissues of mouse, 17:31869 (R;CN;In Chinese)
Tapia, V., *See* Marrakchi, A.L., 17:32077
Tarantino, U., *See* Shukla, S.K., 17:31810
Tasker, I.R., *See* Chaiko, D.J., 17:31310
Tatar, L., Beltrami parametrization and gauging of Virasoro and w-infinity algebras, 17:32078 (R;XA)
Tatischeff, B., Experimental searches for narrow dibaryons, 17:32315 (R;FR)
Taubert, E., *See* Glaeb, F., 17:30696
Tauchi, T., *See* Miyamoto, A., 17:31500
Tawil, R.A., *See* Moscovitch, M., 17:31592
Taylor, A. Jr., *See* Stabin, M.G., 17:31903
Taylor, G., *See* Nagayama, Y., 17:32434
Taylor, M., ADASAGE40: Ada application development system, 17:32519 (CM;US)
Taylor, P.L., An integrated optical sensor for GMAW feedback control, 17:31358 (R;US)
Taylor, R.N., *See* Clarke, B.G., 17:30697
Taylor, R.T., *See* Wijensinghe, A.M., 17:30734
Taylor, T.T., *See* Doctor, S.R., 17:30921, 17:31022
Teichmann, T., *See* Lu, Ming-Shih, 17:30765
Tellez, E., *See* Sandin, C., 17:32343
Teischow, K.L., *See* Garcia, G.V., 17:31262
Temmerman, W.M., *See* Stocks, G.M., 17:31215
Tenforde, T.S., Cellular and molecular pathways of extremely-low-frequency electromagnetic field interactions with living systems, 17:32006 (R;US)
Teng Qiuan, *See* Li Caiyun, 17:32383
TenKate, T., *See* Smith, L.L., 17:31287
Tennankore, K.N., *See* Fluke, R.J., 17:31014
Tennant, R.A., *See* Rosocha, L.A., 17:31662
Tennyson, J., *See* Furman, M., 17:31465
Tenrreiro, J., *See* Sandin, C., 17:32343
Tereshchenko, V.V., *See* Soroko, L.M., 17:31567
Terlain, A., *See* Thevenot, G., 17:32441
Terreni, M., *See* Paganelli, G., 17:31816
Testi, N., *See* Chen, H.Y., 17:32564
Teule, G.J.J., *See* Dieren, E.B. van, 17:31909
Thatcher, M., Risk assessment - benefit in scanning medical examination for early detection of breast cancer by means of mammography, 17:31927 (RA;IL;In Hebrew)
Thee, P., *See* Bethge, K., 17:31299
Thein, M., *See* Miller, L.F., 17:31993
Theiss, T.J., Shallow-crack toughness results for reactor pressure vessel steel, 17:31218 (R;US)
Theriault, K., *See* Vandrish, G., 17:31558
Thevenin, P., Study of high energy ion implantation of boron and oxygen in silicon, 17:32376 (R;FR;In French)
Thevenot, G., LIPSIE experiment: Pb17Li irradiation in water loop with on line tritium measurements, 17:32441 (R;FR)
Theyssier, M., *See* Beaudoing, G., 17:30656
Thibodeau, D., Radon and radon daughter products: Their chemistry after alpha-decay, 17:31334 (IA;CA)
Thiesen, T.J., Refractory thermowell for continuous high temperature measurement of molten metal, 17:31609 (PA;US)
Thiyagaragjan, P., Characterization of ^{3}He area sensitive proportional counters at IPNS for SANS applications, 17:31539 (R;US)
Thoma, M.H., Stopping power and viscosity of the quark-gluon plasma, 17:32136 (IA;DE)
Thomas, I.M., Preparation, optical and laser properties of Nd-doped sol-gel silica, 17:32476 (R;US)
Thomas, J.K., Aluminum oxide film thickness and emittance, 17:31038 (R;US)
  Cadmium safety rod thermal tests, 17:30963 (R;US)
  Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
Thomas, K., *See* Merriam, N., 17:30421
Thome, M., *See* Reimk, 17:30625
Thome, R.J., Development of (1) cable in conduit conductors and of (2) an approach to FMECA for Maglev magnet systems, 17:31170 (RA;US)
Thompson, D., *See* Moscovitch, M., 17:31592
Thompson, D.H., *See* Burks, B.L., 17:31355
Thompson, K.A., *See* Briggs, D., 17:31497
Thomson, D.B., The Strategic Arms Reduction Treaty and its verification: Report No. 12, 17:31192 (R;US)
Thorne, L.F., Development of a 1000 g, 10 ms mechanical shock test capability: Final report, 17:31405 (R;US)
Thornton, R.D., High efficiency propulsion and levitation systems, 17:31175 (RA;US)
Thorsness, C.B., *See* Aldis, D.F., 17:30602
  See Cena, R.J., 17:30601
Thout, M., *See* Stettler, M., 17:31508
Thress, M.A., Reactor Operations daily reports, July 1, 1970–June 30, 1971, 17:31007 (R;US)
Thuillier, F., *See* Frappat, L., 17:32116
Thurston, R.S., Liquid hydrogen flow problems in Kiwi reactors, 17:30915 (R;US)
Tian Baiyuan, A new corrosion testing facility with heat flux caused surface boiling conditions, 17:31212 (R;CN;In Chinese)
Tian Jian, A whole reactor model hydraulic test for Qinshan nuclear power plant, 17:30884 (R;CN;In Chinese)
Tian Shihong, *See* Yang Zhenhua, 17:31483
Tian Ying, *See* Liu Jianmin, 17:32386
Tian, M.X., *See* Ri-Kai, W., 17:31564
Tiegs, T.N., Cost-effective sintered reaction-bonded silicon nitride (SRBSN) for structural ceramics, 17:31254 (R;US)
Tillery, M.I., *See* Scripsick, R.C., 17:31720
Timmons, J.H., *See* Phillips, W.T., 17:31815
Timoshenko, G.N., *See* Krylov, A.R., 17:32347
Tinker, J.B., Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)
Tippett, M.K., Tokamak equilibria and transport based on Grad's thirteen moment description, 17:32414 (R;US)
Tiren, S., *See* Ahlbom, K., 17:31734, 17:31735
  See Gale, J., 17:31745
Tirmarche, M., Actual state of the epidemiological study of uranium miners in France, 17:31935 (IA;CA)
Titkov, V.V., *See* Kovalenko, A.D., 17:31574
Titov, A.I., *See* Gudima, K.K., 17:32299
Tkachev, O.G., *See* Nikolaeva, R.M., 17:32235
Tkebuchava, F.G., *See* Surovtsev, Yu.S., 17:32196
Tobin, M.T., *See* Moir, R.W., 17:32471
Todorov, I.T., *See* Furlan, P., 17:32026
Togari, Akifumi, *See* Nishizawa, Kunihide, 17:30761
Togawa, Orihiko, Performances of models for predicting mercury concentrations in fresh-water fish after chronic releases into rivers: Applications to a test scenario of the BIOMOVS study, 17:31754 (R;JP)
Toivonen, T., The peat resources of Aehtaeri and their potential use. Part 1, 17:30495 (R;FI;In Finnish)
  The peat resources of Aehtaeri and their potential use. Part 2, 17:30517 (R;FI;In Finnish)
  The peat resources of Kuortane and their potential use, 17:30512 (R;FI;In Finnish)
  The peat resources of Toeysae and their potential use, 17:30515 (R;FI;In Finnish)
  See Sten, C.G., 17:30506
Toldo, F., *See* Soukas, A., 17:31477
Tolkachev, E.A., *See* Shnir, Ya.M., 17:32133
Tolmie, D.E., HIPPI and Fibre Channel, 17:32557 (R;US)
Toloczko, M.B., *See* Garner, F.A., 17:31237
Tomasoski, R.J., *See* Snow, S.L., 17:31414
Tomil'chik, L.M., *See* Shnir, Ya.M., 17:32133
Tomza, I., *See* Lebecka, J., 17:31722
Toneev, V.D., *See* Gudima, K.K., 17:32299
Tong Yunxian, Using probability density distribution analysis of bubble diameter and spatial frequency analysis to identify flow pattern of two-phase flow in an unvisual pipe, 17:31377 (R;CN;In Chinese)
  See Han Bing, 17:31605
  See Li Rizhu, 17:30970, 17:31381
  See Wu Shaorong, 17:31380
Tonkyn, R.G., *See* Wiedmann, R.T., 17:32360
Tonon, G., *See* Litaudon, X., 17:32423
Torchilin, V., *See* Danilov, S., 17:31788
Tortorelli, P.F., The nature of scales grown on binary Cr-Nb alloys, 17:31219 (R;US)

See DeVan, J.H., 17:31216
Toth, K.S., Study of short-lived rare earth nuclei near the proton drip line, 17:32213 (R;US)
The α-decay properties of light uranium isotopes, 17:32244 (R;US)
Touhill, C.J., An evaluation of Hanford water treatment practices addendum, 17:30969 (R;US)
Toumanian, A.R., *See* Babayan, A.Z., 17:31499
Tournier, E., *See* Vacher, J., 17:31771
Trapp, J.A., *See* Mortensen, G.A., 17:31129, 17:31390
Traubenberg, M.R. de, Twisted WZW superstring solutions, 17:32071 (R;FR)
Trautmann, W., *See* Mueller, W.F.J., 17:32291
Travis, C.C., *See* Walter, K.A., 17:30746
Treiner, J., *See* Chomaz, Ph., 17:32219
Trembath, L., *See* Ozker, K., 17:31781
Tribouillard, C., *See* Anne, R., 17:31484
Triplett, M.B., Public involvement in the Hanford Double-Shell Tank waste disposal program, 17:30712 (R;US)
Trost, H.-J., *See* Barnett, R.M., 17:32152
Trowbridge, L.D., Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)
Truci, G., *See* Paganelli, G., 17:31816
Trujillo, P.E. Jr., *See* Dyer, R.B., 17:31630
Trumper, A.E., *See* Ceccatto, H.A., 17:32389
Truong Xuan Duc Ha, Differential inclusions governed by convex and nonconvex perturbation of a sweeping process, 17:32021 (R;XA)
Existence of viable solutions for nonconvex-valued differential inclusions in Banach spaces, 17:32022 (R;XA)
Truran, J.W., *See* Starrfield, S., 17:32059, 17:32060
Tsambel, V., Systems for study on spatial beam characteristics based on CCD, 17:31459 (R;SU;In Russian)
Tsenov, S.I., Dissipative particle dynamics in ee-bar storage rings in the presence of linear synchro-betatron coupling, 17:31534 (R;SU)
Linear synchro-betatron resonances, driven by beam-beam interaction, 17:31532 (R;SU)
Tsinontides, S.C., Yield stresses in uniformly fluidized suspensions, 17:30541 (RA;US)
Tsuchiya, Katsumi, The pendulum model for wake size prediction for a gas bubble in liquid-solid suspensions, 17:31382 (RA;US)
Tsui, B.M., *See* Lathrop, K.A., 17:31885
Tsukamoto, T., *See* Miyamoto, A., 17:31500
Tsuneoka, Masaki, Design of JAERI Gyrotron Test Facility, 17:32461 (R;JP;In Japanese)
Tsyganov, Eh.N., *See* Vodop'yanov, A.S., 17:31573
Tucholski, A., *See* Bozek, P., 17:32252
See Mueller, W.F.J., 17:32291
Tuluca, A., *See* Potter, T.F., 17:31115
Tummillo, A.F., *See* DeLuca, W.H., 17:31043
Turchetta, R., Development of high resolution double-sided silicon detectors with projective readout, 17:31548 (R;FR;In French)
Turchi, P.E., *See* Stocks, G.M., 17:31215
Turkcan, E., *See* Ciftcioglu, O., 17:30959, 17:30961
Turner, C., *See* Fahrenholtz, J.C., 17:31364
Turner, J.E., *See* Stubbs, J.B., 17:31901
Tyler, K.K., Quantitative methods for developing C2 system requirement, 17:31624 (R;US)
Tzur, D., K-Ar measurements in the Hatrurim formation, Arad area, 17:31709 (IA;IL)

U

Uckan, T., Biasing experiments on the Advanced Toroidal Facility, 17:32404 (R;US)
Effects of limiter biasing on the ATF torsatron, 17:32433 (R;US)
Udseth, H.R., *See* Wahl, J.H., 17:31763
Uhl, M., The EFF-2 evaluation for the reaction systems $n + {}^{52}Cr$, ${}^{56}Fe$, ${}^{58}Ni$ and ${}^{60}Ni$: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32282 (R;NL)
The sensitivity of statistical model capture calculations to model assumptions: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32217 (R;NL)
Ulmgren, P., *See* Warnquist, B., 17:31139
Umeki, H., Sensitivity analysis and validation, 17:30731 (RA;SE)
Umerov, R.A., *See* Glazov, A.A., 17:31436
Umnikov, A.Yu., *See* Kaptari, L.P., 17:32112
Underwood, J.H., *See* Koch, J.A., 17:31426
Uno, S., *See* Ida, H., 17:31502
Uno, Shoji, Design of TOPAZ masking system using EGS4, 17:31501 (RA;JP;In Japanese)
Unterweger, M.P., *See* Coursey, B.M., 17:31884
Upadhye, R.S., *See* Camp, D.W., 17:30737
Urakawa, J., *See* Ida, H., 17:31502
Urgancioglu, I., *See* Ozker, K., 17:31781
Urtiew, P.A., Diagnostic of shock wave processes, 17:31366 (R;US)
Usmanov, P.N., *See* Mikhajlov, I.N., 17:32237
Uvebrant, P., *See* Vestergren, E., 17:31904

V

Vaagen, J.S., *See* Gareev, F.A., 17:32256
Vabre, M., *See* Villegier, J.C., 17:31251
Vacher, J., Interest of TOF PET for clinical applications, 17:31771 (R;FR)
Vacherand, F., *See* Taibi, I., 17:31347
Vaclavinec, J., Physical modelling of a refuse fueled boiler, 17:30808 (R;SE;In Swedish)
Vadeev, V.P., *See* Borovkov, D.P., 17:31437
Vaidyanathan, R., APARNA2: 1-d integral neutron transport slab, 17:32531 (CM;IN)
Valbusa, U., *See* Anghinolfi, M., 17:31530
Valdivia, A.A., *See* Samet, J.M., 17:31939
Valentine, T.E., *See* Mihalczo, J.T., 17:31352
Valeo, E.J., *See* Jardin, S.C., 17:32403
Valero, S., Comparison of computational methods and results concerning the simulation of IH structures with the codes LORAS and DYNAC, 17:31452 (R;FR)
van Asselt, W., *See* Ahrens, L., 17:31476
Van Giai, N., *See* Catara, F., 17:32247
See Chomaz, Ph., 17:32218, 17:32219
Van Hare, D.R., *See* O'Rourke, P.E., 17:31306
van Hulsteyn, D., *See* George, J.S., 17:31849
Van Rij, H.M., *See* Benson, C.G., 17:30871
Van Sciver, S.W., Fluid dynamics of supercritical helium within cable-in-conduit conductors: Progress report, 17:32393 (R;US)
Van Tuyle, G.J., *See* Chan, B.C., 17:30911
See Cheng, H.S., 17:31003
See Slovik, G.C., 17:31004
Vandegrift, G.F., *See* Chaiko, D.J., 17:31310
Vandrish, G., The Pylon 190: A novel filter calibration standard for alpha spectrometry, 17:31558 (IA;CA)
Vangosh, A., Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments, 17:31706 (IA;IL)
Vanin, E., *See* Sergeev, A., 17:32409
Vaninetti, J., *See* Lawson, A.C., 17:32041
Vanyashin, V.S., Coherent decay of positronium bose condensate, 17:32362 (R;XA)
Vapaavuori, O., The corrosion on the surfaces of airpreheaters and electrostatic precipitators in peat-fired boilers, 17:30553 (R;FI;In Finnish)
Vartapetian, A.H., *See* Adamian, F.V., 17:32310
Varvarigou, A., *See* Papadopoulos, M., 17:31782
See Vavouraki, H., 17:31825
Varvarigou, A.D., *See* Cotsyfakis, C., 17:31794
Vassilevich, D.V., Abelian gauge theories on homogeneous spaces, 17:32090 (R;XA)
Vaughan, N., Solar building study. Final report: Spinney Gardens [Crystal Palace, London], 17:30826 (R;GB)
Vaughn, *See* Johnson, K.F., 17:31512
Vaughn, G., *See* Johnson, K.F., 17:31513
Vautherin, D., Nuclear physics of hot dense matter, 17:32229 (R;FR)

Vavouraki, H., Preparation and biodistribution of Tc^{III}-N,N′-ethylenebis (acetylacetone thioiminato) bis (triphenylphosphine) complex, 17:31825 (RA;US)
See Cotsyfakis, C., 17:31794
See Papadopoulos, M., 17:31782
Vaziri, F., *See* Billinghurst, M.W., 17:31779, 17:31790
Veal, B.W. Downey, J.E., *See* Lan, M.D., 17:31264
Vega, G., *See* Saint Jores, P. De, 17:31431
Velicky, B., 12th general conference of the condensed matter division of the E.P.S. V.16A., 17:32372 (I;CS)
Velsko, S.P., *See* Webb, M.S., 17:32477
Vemuri, V., *See* Cedeno, W., 17:32567
Vendel, J., *See* Pourprix, M., 17:30628
Venema, L.B., *See* Ostendorf, R., 17:32253
Vengosh, A., Boron isotope geochemistry in the terrestrial environment, 17:31715 (IA;IL)
Verdera, S., Radiopharmacological studies of ^{99m}Tc-CPI: Experience with isolated rat atrial tissue, 17:31823 (RA;US)
Verhagen, H.W., *See* Voorbraak, W.P., 17:31550
Verkade, J.G., ^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, June 1, 1991–August 31, 1991, 17:30465 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, January 1, 1991–March 31, 1991, 17:30466 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, October 1, 1990–December 31, 1990, 17:30467 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH and -SH functions: Quarterly report, January 1, 1990–March 31, 1990, 17:30468 (R;US)
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Final technical report, 17:30469 (R;US)
Vernon, S.P., *See* Rosen, R.S., 17:31244
Verrall, R.A., *See* Sullivan, J.D., 17:32445
Verschuur, K.A., Shielding calculations for NET: NET contract 89-226, first intermediate report, 17:32449 (R;NL)
Verzegnassi, C., Phenomenology of one extra neutral Z, 17:32198 (R;FR)
See Blondel, A., 17:32200
See Chiappinelli, A., 17:32148
Vestergren, E., Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
Vetola, H., *See* Nyyssoelae, H., 17:31137
Vetrano, J.S., Influence of dilute impurities on the evolution of defect cascades in nickel, 17:31201 (R;US)
Vetter, T., *See* Batko, G., 17:32298
See Kalmbach, U., 17:32160
Viano, J.B., *See* Desesquelles, P., 17:32268
Vick, D.O., *See* Bostick, D.T., 17:30643
Videbaek, F., *See* Moskowitz, B., 17:32286
Vieira, D., *See* Bernas, M., 17:32228
Vierinen, K.S., *See* Toth, K.S., 17:32213
Vigdor, S.E., *See* Arvieux, J., 17:32153, 17:32154
Vikis, A.C., *See* Fluke, R.J., 17:31014
Vila, P., *See* Leon, A., 17:31818
Vilenskij, B.M., *See* Bardin, D.Yu., 17:32146
Villardos, M.A., *See* Rosen, R.S., 17:31244
Viljoen, J., *See* Balint, A.B., 17:31946
Villard, C., *See* Villegier, J.C., 17:31251
Villegier, J.C., YBCO based multilayers for optoelectronic devices, 17:31251 (R;FR)
Viippunen, J., *See* Luttu, J., 17:31116
Viippunen, P., *See* Luttu, J., 17:31140
Vilsboell, N., *See* Rasmussen, P., 17:30858
Vincent, S., Thermal pretreatment effect on polycrystalline tin dioxide electrical properties. Application to methane detection, 17:31615 (R;FR;In French)
Vineyard, E.A., *See* Hinton, D.L., 17:31386
Vinogradov, V.B., Analysis of data from the HYPERON facility in experimental investigation of the inclusive production of K^0 and K^{*0}(892) mesons, 17:31577 (R;SU;In Russian)
Virtanen, K., The mires and their peat resources in Oulainen, 17:30489 (R;FI;In Finnish)
The mires and their peat resources in Liminka, Lumijoki and Temmes, 17:30507 (R;FI;In Finnish)
Virzi, F., *See* Hnatowich, D.J., 17:31830
Visentin, B., *See* Courtois, A., 17:32275
Viswanathan, V.K., *See* Newnam, B.E., 17:31413
Vitale, A.A., *See* Canellas, C.O., 17:31843
Vivargent, M., *See* Schneegans, M., 17:31584
Vo, T.V., *See* Doctor, S.R., 17:30921, 17:31022
Vodop'yanov, A.S., Investigation of two-track resolution efficiency of the VKD vertex detector using simulation of p-barp interactions at 6 TeV, 17:31573 (R;SU;In Russian)
Voet, M., *See* Bonne, A., 17:30687
Voevodin, M.A., *See* Tsambel, V., 17:31459
Voevodska, M., *See* Bouzhik, Eh., 17:31972
Vogt, R., Systematics of charm hadroproduction, 17:32159 (IA;DE)
Vohra, K.G., *See* Subba Ramu, M.C., 17:30618
Volchinsky, V.G., *See* Adamian, F.V., 17:32310
Volckaert, G., *See* Bonne, A., 17:30687
Volokhovskaya, T.A., *See* Shahbazian, B.A., 17:32329
Von Oertzen, D.W., *See* Davidson, N.J., 17:32227, 17:32295
Vonach, H., *See* Fu, C.Y., 17:32284
Vonka, V., *See* Duijves, K.A., 17:30681
Voorbraak, W.P., Neutron metrology in the HFR: Neutron and gamma metrology in the free beam of HB 11, 17:31550 (R;NL)
See Appelman, K.H., 17:32451
See Baard, J.H., 17:30983, 17:31225, 17:32450
See Ketema, D.J., 17:31226
See Polle, A.N., 17:30982
Voorhes, D.W., *See* Mansur, D.J., 17:31610
Vorlicek, V., *See* Velicky, B., 17:32372
Vorobel, V., *See* Egorov, V.G., 17:32249
Voronin, V.V., *See* Alekseev, V.L., 17:32380
Vorozhtsov, S.B., *See* Borisov, O.N., 17:31489
Voshedchenko, B.M., *See* Bystritskij, V.M., 17:31232
Voss, C., *See* Ahlbom, K., 17:31734, 17:31735
Vossler, J., *See* Roper, J.R., 17:31363
Vranjes, J., Vortices with a nonuniform group velocity, 17:32407 (R;SE)
See Davydova, T.A., 17:32406
Vulkan, U., Radon in rock units in the Negev, Israel, 17:31710 (IA;IL)
Vyklicky, M., *See* Bouska, P., 17:31230

W

Wachtel, J.A., *See* Carter, R.J., 17:30956
Wachter, J.R., *See* Langner, D.G., 17:30708
Wacker, K., *See* Barnett, R.M., 17:32152
Waddell, M.W. Jr., A stochastic/deterministic method for transient, three-dimensional neutron transport, 17:32353 (R;US)
Wade, N.L., *See* Borkowski, J.A., 17:31021
Wagner, A., *See* Baltes, P., 17:32297
See Senger, P., 17:32296
Wagner, J.S., Propagation of relativistic high current electron beams across the geomagnetic field, 17:31463 (R;US)
Wagner, T.D., *See* Carlson, B.M., 17:32512, 17:32558
Wagner, V., *See* Kugler, A., 17:31566
Wahl, J.H., Capillary electrophoresis - electrospray ionization mass spectrometry in small diameter capillaries, 17:31763 (R;US)
Wahl, R., *See* Plotzke, K.P., 17:31784
Wakshal, E., *See* Issar, A., 17:31712
Walcher, Th., *See* Andresen, H., 17:32261
Wali, *See* Balachandran, 17:32066
Walker, D.W., Standards for message-passing in a distributed memory environment, 17:32559 (R;US)
See Choi, Jaeyoung, 17:32514
Walker, R., *See* Dewey, H., 17:30707
Walker, R.L., *See* Bostick, D.T., 17:30643
Wall, M., Glazed courtyard at Taernan: Thermal performance of the courtyard and surrounding residential buildings. Measurements and calculations, 17:31093 (R;SE)
Wallace-Sims, R., *See* Naish, C.C., 17:30691
Walling, R.S., *See* Wan, A.S., 17:31422

Wallman, P.H., Mild coal gasification: Product separation, 17:30460 (R;US)
Wallmueller, R., *See* Glaeb, F., 17:30696
Walsh, C.T., Applications of micellar enzymology to clean coal technology: Tenth quarterly report, 17:30438 (R;US)
Walsh, D.S., *See* Nygren, R.E., 17:32470
Walter, F., *See* Glaeb, F., 17:30696
Walter, J.B., *See* Garcia, G.V., 17:31262
Walter, K.A., Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Walters, W.B., *See* Mantica, P.F., 17:32245
Waltjen, K., *See* Avicola, K., 17:32064
Walton, O.R., Numerical simulation of inclined chute flows of monodisperse, inelastic, frictional spheres, 17:30531 (RA;US)
Wambach, J., *See* Mull, V., 17:32226
Wan Chunrong, *See* Dai Weizhi, 17:30923
See Hu Xien, 17:30639
Wan Longfu, Manufacturing technology of top nozzle and bottom nozzle in fuel assembly for nuclear power plant, 17:30883 (R;CN;In Chinese)
Wan Yanxi, *See* Yang Juncheng, 17:31689
Wan Yude, Study on the focal-plane detector system for medium heavy ions, 17:31546 (R;CN;In Chinese)
Wan, A.S., Self-consistent one-dimensional modelling of x-ray laser plasmas, 17:31422 (R;US)
Wand, B., *See* Gaydosh, M., 17:31525
Wander, J.D., *See* Dyer, R.B., 17:31630
Wang Chengzhi, *See* Wang Shuyu, 17:30788
Wang Chuanzhen, *See* Zhang Hehu, 17:31350
Wang Cunren, *See* Tian Baiyuan, 17:31212
Wang Deming, *See* Liu Nangai, 17:30785
Wang Guang, Investigation of the neutron diffraction anomaly and electrical behaviour of α-LiIO$_3$ single crystal under AC field, 17:31266 (R;CN;In Chinese)
Wang Huarong, *See* Chen Dianshan, 17:30881
Wang Liuyi, *See* Zhu Shoupeng, 17:31877
Wang Maoquan, The anomalous transport caused by magnetic perturbation in tokamak, 17:32446 (R;CN)
The calculations of magnetic diffusion constant and Kolmogorov entropy in a stochastic field region, 17:32396 (R;CN;In Chinese)
The suppression of multiple tearing modes using helical field, 17:32395 (R;CN;In Chinese)
Wang Shoushe, Using helium mass-spectrometer leak detector to detect the leak of vaporizer in Qinshan nuclear power plant, 17:30885 (R;CN;In Chinese)
Wang Shunxi, *See* Wang Yugui, 17:32385
Wang Shuyu, Using tritium oxide to study moisture transfer in drying phase of mixed dry and wet grain, 17:30788 (R;CN)
Wang Taichun, *See* Yang Zhenhua, 17:31483
Wang Wenkang, *See* Cheng Liangcheng, 17:31379
Wang Xuejun, *See* Hu Xien, 17:30639
Wang Yinju, Machining technology for spider of control assembly, 17:30954 (R;CN;In Chinese)
Wang Yugui, Characteristic of the flux pinning at intergrain boundaries in bulk Bi-Pb-Sr-Ca-Cu-O superconductors, 17:32385 (R;CN)
Wang Zhengyan, *See* Liu Hairui, 17:32048
Wang Zhibo, *See* Pan Ziqiang, 17:30964
Wang, C., *See* Jardin, S.C., 17:32403
Wang, Chi-Sheng, *See* Berry, G.F., 17:30536
Wang, F., Total destruction of organic compounds in aqueous wastes by a UV/H_2O_2 process, 17:30738 (R;US)
Wang, F.T., *See* Gray, L.W., 17:31322
Wang, J.C., Model for impedance of an ionic conductor sandwiched between blocking electrodes, 17:31321 (R;US)
Wang, M.C., *See* Ri-Kai, W., 17:31564
Wang, Quanlu, *See* Deluchi, M., 17:31187
Wang, T.S.T., In-111-acetylacetone-cyclodextrin inclusion complex: A new form of radiopharmaceutical, 17:31793 (RA;US)
Wang, X.W., *See* Lung, C.W., 17:31229
Wang, Z., *See* Shi, Donglu, 17:31247
Wantuck, P.J., *See* Rosocha, L.A., 17:31662
Ward Alter, H., *See* Gingrich, J.E., 17:31556
Warde, E., *See* Didelez, J.P., 17:32317
Ware, A.A., The electrostatic wake of a superthermal test electron in a magnetized plasma, 17:32420 (R;US)
Ware, A.G., A survey of fatigue monitoring in the nuclear power industry, 17:30941 (R;US)
Warne, L.K., Eddy current power dissipation at sharp corners, 17:32061 (R;US)
Warnquist, B., Black liquor gasification: Consequences for pulping process and energy balance, 17:31139 (R;SE)
Warpinski, N.R., *See* Lorenz, J.C., 17:30587
Warren, D., *See* Stettler, M., 17:31508
Warren, F.E., Access control issues and solutions for large sites, 17:30778 (R;US)
Wassem, F.A., GENED ENV ROUTINES: Subroutine library, 17:32521 (CM;US)
Wasserman, H.J., *See* Lubeck, O.M., 17:32556
Watanabe, K., Evaporation measurement in the validation drift - part 2, 17:31739 (R;SE)
Evaporation measurement in the validation drift - part 3: Comparison between the first and second set of measurement results, 17:31744 (R;SE)
See Pamela, J., 17:32444
Watanabe, Shin-ichi, Beam diagnostic instruments of TARN II, 17:31537 (RA;JP)
Watanabe, Tadashi, Two-phase flow characteristics analysis code: MINCS, 17:31394 (R;JP)
Watanabe, Y., *See* Miyamoto, A., 17:31500
See Pin, F.G., 17:32511
Watanabe, Yukinobu, *See* Koori, Norihiko, 17:32322
Waters, L., Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)
Watkins, A.D., *See* Taylor, P.L., 17:31358
Watkins, B.E., *See* Aldis, D.F., 17:30602
Watson, A.P., *See* Jenkins, R.A., 17:31642
Watson, E.C., *See* Houston, J.R., 17:32536
See Strenge, D.L., 17:32535
Watson, E.E., Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)
See Stabin, M.G., 17:31905
Watteau, J.P., Experimental program on the 20 TW laser system, 17:32394 (R;FR)
See Andre, M., 17:32439
Watterson, C.E., *See* Mozzano, S.G., 17:31608
Watts, K., Analysis of reservoir heterogeneities due to shallowing-upward cycles in carbonate rocks of the Pennsylvanian Wahoo Limestone of Northeastern Alaska: Annual report, October 1990–September 1991, 17:30560 (R;US)
Waxweiler, R.J., *See* Roscoe, R.J., 17:31943
Weaver, K.R., *See* Fluke, R.J., 17:31341
Webb, B.W., *See* Queiroz, M., 17:30550
Webb, M.S., High bandwidth second-harmonic generation in partially deuterated KDP, 17:32477 (R;US)
Webb, S.W., Steady-state saturation profiles for linear immiscible fluid displacement in porous media, 17:30720 (R;US)
Weber, C.F., Iodine chemical forms in LWR severe accidents, 17:30874 (RA;JP)
Weber, K., *See* Maruyama, T., 17:32306
Webster, C.E., *See* DeLuca, W.H., 17:31043
Wehrberger, K., *See* Friedrich, R., 17:32223
Wei Qin, *See* Cao Xiaowen, 17:32384
Wei, J., Tune spread due to magnetic multipoles in RHIC, 17:31447 (R;US)
Wei, Jie, Bunched beam stochastic cooling, 17:31446 (R;US)
Wei, Wen-Cheng J., Dislocation and pores in mullite from diphasic gels, 17:31273 (R;US)
Weigold, H., *See* Cholewa, M., 17:31852
Weiland, J., *See* Vranjes, J., 17:32407
Weiner, R.E., $Ga(NO_3)_3$ uptake by human-derived small cell lung cancer cells, 17:31789 (RA;US)
Weintraub, M., *See* Cooper, M.H., 17:30537
Weise, W., *See* Kusaka, K., 17:32093
Weiser, G., *See* Talmor, A., 17:31665
Weiss, S., *See* Schomaecker, K., 17:31783
Weitzner, H., Plasma properties: Progress report for 1991, 17:32415 (R;US)

Welke, G.M., *See* Barz, H.W., 17:32301
Welling, M., *See* Andresen, H., 17:32261
Wells, F.D., Log-ratio beam position monitoring at 425 MHz, 17:31510 (R;US)
Wells, M.B., *See* Lampley, C.M., 17:32545
Wen Xianbing, *See* Wang Yinju, 17:30954
Wen, H., *See* Bulos, F., 17:31522
Wendelbo, P., *See* Holm, E.L., 17:31408
Wendroff, B., The compactness of front tracking for chromatography electrophoresis and incompressible multiphase flow, 17:32365 (R;US)
Wendt, J.O.L., *See* Shadman, F., 17:30548, 17:30549
Weneser, J., *See* Rhoades-Brown, M.J., 17:31448
Weng, W.T., *See* Ahrens, L., 17:31476
  See Zhang, S.Y., 17:31449, 17:31478
Werner, R.K., *See* Dewanjee, M.K., 17:31801, 17:31821
Werner, T.R., Towards superdeformation in the quasicontinuum: microscopic view of the excited superdeformed bands and the corresponding level densities, 17:32214 (R;FR)
Wessel, S., *See* Emden, W. van, 17:31519
Wessels, B.W., External beam and radioimmunotherapy dosimetry comparison of colorectal xenografts, 17:31883 (RA;US)
West, K., *See* Skaarup, S., 17:31044
Westbrook, C.K., *See* Cowart, J.S., 17:31159
  See Papavassiliou, J., 17:31158
Westerberg, I., *See* Hedman, G., 17:30814
Westerholm, R., Impact of fuels on diesel exhaust emissions: A chemical and biological characterization, 17:30582 (R;SE)
Wheeler, A.J., *See* Notley, K.R., 17:31655
Wheeler, M.F., Three-dimensional bioremediation modeling in heterogeneous porous media, 17:31728 (R;US)
Wheeler, W., *See* Muller, J., 17:31934
Whelan, G., *See* Codell, R.B., 17:32546
White, B.W., Summary of a graded approach to fire hazard analysis, 17:30762 (R;US)
White, D.A., *See* Walter, K.A., 17:30746
White, M.G., *See* Wiedmann, R.T., 17:32360
White, R.B., Transport in a stochastic magnetic field, 17:32435 (R;US)
White, R.E., *See* Appleby, A.J., 17:31086
White, R.K., *See* Suter, G.W. II, 17:31699
  See Walter, K.A., 17:30746
Whitehead, D.W., *See* Payne, A.C. Jr., 17:31023
Whiteman, C.D., Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)
Whitlow, L.W., A combined analysis of SLAC experiments on deep inelastic e-p and e-d scattering, 17:32183 (R;US)
Wichner, R.P., Evaluation of MHTGR fuel reliability, 17:30904 (R;US)
Widawsky, D.I., Safety factors on Maglev systems, 17:31182 (RA;US)
Widell, K.E., *See* Holm, E.L., 17:31408
Widodo, Susilo, *See* Koori, Norihiko, 17:32322
Wiebe, L.I., Structure-activity relationships among nitroimidazole nucleosides used as markers of tissue hypoxia, 17:31915 (RA;US)
  Uptake of radiolabeled 1-(2-deoxy-2-fluoroarabinofuranosyl)-5-halouracils by experimental tumors in vivo, 17:31785 (RA;US)
Wiedmann, R.T., Rotationally resolved photoionization with coherent VUV radiation, 17:32360 (R;US)
Wiele, J. van de, *See* Morlet, M., 17:32314
Wierman, T.E., *See* Farmer, F.G., 17:30759
Wiggins, J.T., *See* Williams, D.F., 17:31330
Wigle, D.T., *See* Morrison, H.I., 17:31937
Wijensinghe, A.M., Preliminary feasibility and cost analysis of the in-situ microbial filter concept, 17:30734 (R;US)
Wilbanks, T.J., Intermediate evaluation of USAID/Cairo energy policy planning project, 17:31049 (R;US)
Wildman, D.J., Using the refractive index matched technique to study the flow properties of slurries, 17:30521 (RA;US)
Wiles, D.R., *See* Thibodeau, D., 17:31334
Wiley, J.C., *See* Ware, A.A., 17:32420
Wilgen, J.B., *See* Uckan, T., 17:32404, 17:32433
Wilhelmsson, H., Plasma temperature and density dynamics including particle and heat pinch effects, 17:32408 (R;SE)
Wilke, G.D., *See* Thomas, I.M., 17:32476
Wilke, M.D., Electron-beam diagnostics development for the Los Alamos FEL facility, 17:31511 (R;US)
Wilks, S.C., *See* Eder, D.C., 17:31425
Williams, D.F., Flowsheet for ^{63}Ni production, 17:31330 (R;US)
Williams, J.M., Supercritical CO$_2$ cleaning for waste minimization, 17:31638 (R;US)
Williams, K.A., *See* Hay, R.V., 17:31892
Williams, K.L., *See* Shapiro, C., 17:30663
Williams, W.H., *See* Moir, R.W., 17:32471
Williamson, R.L., *See* Rabin, B.H., 17:31276
Willis, A., *See* Morlet, M., 17:32314
Willis, J.O., *See* Gotoh, S., 17:31259
  See McHenry, M.E., 17:32391
Willis, N., *See* Tatischeff, B., 17:32315
Wilmarth, P.A., *See* Toth, K.S., 17:32213
Wilschut, H.W., *See* Ostendorf, R., 17:32253
Wilson, L.A., SPECTDOSE: A computerized radiation dosimetry methodology for use with radiolabeled antibodies using quantitative SPECT, 17:31898 (RA;US)
Wilson, M.L., *See* Barnard, R.W., 17:30719
  See Gauthier, J.H., 17:30717
Wilson, W.B., Development and status of fission-product yield data and applications to calculations of decay properties, 17:32340 (R;US)
Wilt, P., *See* Wuosmaa, A.H., 17:31540, 17:32212
Winberg, A., Analysis of spatial correlation of hydraulic conductivity data from the Stripa mine, 17:31740 (R;SE)
Winchell, D.F., *See* Lee, I.Y., 17:32243
Winger, B.E., *See* Light-Wahl, K.J., 17:31764
Wingerter-Seez, I., *See* Mours, B., 17:31585
Winn, W.G., Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector, 17:31748 (R;US)
Winslow, J.C., BOILER PERF MODEL3.0: Fossil-fired boilers, 17:32522 (CM;US)
Winston, R., Participation in multilateral effort to develop high performance integrated CPC evacuated collectors: Final report, July 1, 1986–May 31, 1987, 17:30828 (R;US)
Wintenberg, A.L., Sensor-based whole-arm obstacle avoidance for unstructured environments, 17:31354 (R;US)
Wise, K.N., *See* O'Brien, R.S., 17:30614
Wise, M.O., *See* Creamer, S.C., 17:30690
  See Findlay, D.J.S., 17:30688
Wise, R.F., *See* Douglas, D.G., 17:30645
Witherell, C.E., Wastage-resistant FBC evaporator tubing through microalloying, 17:31223 (R;US)
Wohlfarth, D., *See* Kaempfer, B., 17:32292
Wohlgemuth, R., *See* Kugler, A., 17:31566
Wohlhuter, F.K., Effects of physical properties and geometry on shapes and stability of polarizable drops in external fields, 17:32049 (R;US)
Wolery, T.J., EQ3/6 V7.0: Geochemical modeling of aqueous systems, 17:32525 (CM;US)
  EQ3/6 V7.1: Geochemical modeling of aqueous systems, 17:32526 (CM;US)
Wolff, M., *See* Issar, A., 17:31712
Wolford, A.J., Aging data analysis and risk assessment: Development and demonstration study, 17:31024 (R;US)
Wong, H., *See* Kovscek, A.R., 17:30571
Wong, V.C., *See* Sykes, T.R., 17:31805
Wongwatcharadumrong, R., Detection of cells infected by Thailand strains of pseudorabies virus using a specific DNA probe, 17:31861 (RA;XA)
Woo, T.K., *See* Sykes, T.R., 17:31805, 17:31811
Wood, B.D., Effects of lag and maximum growth in contaminant transport and biodegradation modeling, 17:31727 (R;US)
Wood, C.C., *See* George, J.S., 17:31849
Wood, R., *See* Allen, S.L., 17:32474
Woodle, B.M., *See* Cooper, M.H., 17:30537
Woods, C.M., Development of a laser ignited all secondary explosive DDT detonator, 17:31632 (R;US)
Woods, D., *See* Markley, F., 17:31603
Woody, C., Radiation damage in cesium iodide and other scintillating crystals, 17:31542 (R;US)
Wooten, W., *See* Stabin, M.G., 17:31903
Worgan, K.J., *See* Grogan, H.A., 17:30732
Worley, P.H., *See* Carlson, B.M., 17:32512, 17:32558

Wormser, G., Beauty physics-CKM matrix, 17:32174 (R;FR;In French)
Search for new particles in the SUSY framework, 17:32169 (R;FR)
Wozniak, D.G., *See* Thiyagaragjan, P., 17:31539
Wren, J.C., Modelling of iodine chemistry: The LIRIC database, 17:32574 (RA;JP)
Wrenn, M.D., *See* Singh, N.P., 17:31949
Wrenn, M.E., *See* Paschoa, A.S., 17:31951
Wright, M.J., Are the current dose limits for uranium mines too high?, 17:30619 (IA;CA)
Canadian and U.S. approaches to occupational health regulations, 17:30780 (IA;CA)
Wright, R.M., Image processing and computer controls for video profile diagnostic system in the ground test accelerator (GTA), 17:31506 (R;US)
Wright, R.N., *See* Rabin, B.H., 17:31276
See Sellers, C.H., 17:31228
Wright, S.B., *See* Wilbanks, T.J., 17:31049
Wrixon, A.D., *See* Dixon, D.W., 17:31719, 17:31953
Wu Bingzhe, Radiation monitor system for nuclear power plants, 17:30955 (R;CN;In Chinese)
Wu Guoxin, Effects of ^{60}Co γ-ray irradiation on human platelets, 17:31871 (R;CN;In Chinese)
Radioimmunoassay for platelet activation specific protein GMP-140 on the platelet surface and in plasma, 17:31858 (R;CN;In Chinese)
Wu Shaorong, An experimental investigation on turbulent flow through symmetric wall-subchannels of rod bundles, 17:31378 (R;CN;In Chinese)
Investigation on subcold boiling-induced hydrodynamic instability in a natural circulation system, 17:31380 (R;CN;In Chinese)
Wu Xiaoling, *See* Cao Xiaowen, 17:32384
Wu Xinxin, *See* Wu Shaorong, 17:31380
Wu Xueyi, Improving the properties of stainless steel electron-beam welds by laser treatment, 17:31213 (R;CN;In Chinese)
Wu Yonghui, *See* Li Bizhong, 17:31827
Wu, C., *See* Hnatowich, D.J., 17:31831
See Mardirossian, G., 17:31807
Wu, Cheng-Kang, *See* Buckius, R.O., 17:30551
Wu, Guanghui, *See* Carlos, R.C., 17:32052
Wu, Yanlin, *See* White, R.B., 17:32435
Wuebbles, D.J., The role of refrigerants in climate change, 17:31679 (R;US)
Wunderlich, B., *See* Xenopoulos, A., 17:31269
Wuosmaa, A.H., Evidence for alpha-particle chain configurations in ^{24}Mg, 17:32212 (R;US)
The Argonne silicon strip-detector array, 17:31540 (R;US)
Wyman, C.E., *See* Spindler, D.D., 17:30807
Wyntjes, G., *See* Mansur, D.J., 17:31610
Wyon, C., Optical properties of Er^{3+} and Tm^{3+} doped Y_2SiO_5, 17:31250 (R;FR)

X

Xenopoulos, A., Thermal analysis of alkylammonium salts, 17:31269 (R;US)
Xia Linhua, Coupling and decoupling of pions and deltas in nuclear matter, 17:32225 (IA;DE)
Xia Yuanfu, *See* Yu Zhi, 17:32371
Xia Zufeng, *See* Zuo Jiahong, 17:30888
Xie Hanming, *See* Lai Dongxian, 17:31411
Xie Jikang, *See* Li Guoxiang, 17:32399
Xie Yongzhong, *See* Ren Juqian, 17:32397
Xie, H., *See* Shukla, S.K., 17:31786
Xiong Xiaozhong, *See* Wang Yugui, 17:32385
Xu Changgen, *See* Du Xiangwan, 17:31191
Xu Chenwu, *See* Yang Hefeng, 17:31855
Xu Linbao, *See* Zhang Jiatai, 17:31482
Xu Shiming, *See* Zhao Wenhu, 17:31690, 17:31875
Xu Xuelian, *See* Tian Baiyuan, 17:31212
Xu Yingdong, *See* Liu Keliang, 17:31872
Xu Yujie, Modulate function and effect of ^{60}Co γ-rays on ConA-induced CD_4^+ and CD_8^+ subpopulations of lymphocytes, 17:31874 (R;CN;In Chinese)
Xue, Y., *See* Sykes, T.R., 17:31805

Y

Yaffe, Y., *See* Assael, Y., 17:31700
Yahr, G.T., *See* Swinson, W.F., 17:30973
Yale, C., *See* Saccomanno, G., 17:31942
Yamada, M., *See* Nagayama, Y., 17:32434
Yamaguchi, Ryoji, *See* Koori, Norihiko, 17:32322
Yamaguchi, Y., Preparation of geothermal resource map of Japan, 17:30833 (IA;JP;In Japanese)
See Takahashi, M., 17:30836
Yamamoto, a., Effects of cooling-air injection on secondary flows and losses in a turbine cascade, 17:31400 (R;JP)
Yamamoto, Hiroshi, *See* Kawade, Kiyoshi, 17:32321
Yamamuro, N., *See* Fu, C.Y., 17:32284
Yan Qimin, Determination of plutonium in environmental water, 17:31292 (R;CN;In Chinese)
Yanagisawa, Kazuaki, Pre-pulse irradiation examination, NSRR pulse irradiation and post-pulse irradiation examination of MH-2 fuel rod, 17:30896 (R;JP;In Japanese, English)
Yanev, Y., *See* Shier, W., 17:30999
Yang Hefeng, Study on the early and late mutants of radiation induced rice, 17:31855 (R;CN;In Chinese)
Yang Hui, *See* Cao Xiaowen, 17:32384
Yang Juncheng, Distribution of natural uranium in Jiuquan ecological environment, 17:31689 (R;CN;In Chinese)
Yang Mingjin, *See* Feng Mingquan, 17:30889
See Gao Weisen, 17:31214
Yang Xiaoyun, *See* Zheng Jinmei, 17:31544
Yang Xin, *See* Dai Weizhi, 17:30923
Yang Xuexian, Environmental and agricultural impacts of the Chernobyl NPP accident on the countries of the northern hemisphere, 17:31867 (R;CN;In Chinese)
Yang Yu, *See* Wang Yugui, 17:32385
Yang Zhen, *See* Wang Guang, 17:31266
Yang Zhenhua, One and three dimensional numerical simulation of millimeter wave fel amplifiers with rectangular waveguide, 17:31483 (R;CN;In Chinese)
Yang, F.C., Parametric studies of suspension and propulsion subsystems in a Maglev transportation system, 17:31179 (RA;US)
Yang, L., *See* Catalano, A., 17:30821
Yang, S.L., A preliminary study of the effect of equivalence ratio on a low emissions gas turbine combustor using KIVA-II, 17:30866 (R;US)
Yang, W.C., *See* Cooper, M.H., 17:30537
Yang, Y., *See* Campbell, C.S., 17:30520
Yano, Y., Statistical distribution of temperatures and physical properties of geothermal areas in Japan, based on logging and core data of boreholes, 17:30839 (IA;JP;In Japanese)
Yarbro, S., *See* Dewey, H., 17:30707
Yates, A., *See* Bremner, W.B., 17:30695
Yau, W.W.F., *See* Allison, D.K., 17:31035, 17:31037
Yavorska, A., *See* Rosek, O., 17:31971
Yaz'kov, V.V., *See* Afanas'ev, L.G., 17:31568
Ye Yunhua, *See* Li Bizhong, 17:31827
Yechieli, Y., *See* Gardosh, M., 17:31702
Yee, J.H., *See* Mayhall, D.J., 17:31421
Yeh, S.D.J., *See* Daghighian, F., 17:31902
Yin Jun, *See* Wang Shuyu, 17:30788
Yin Shunjiu, *See* Lin Yibing, 17:30787
Yin Xiejin, Hard X-ray measurement on HT-6B tokamak, 17:32400 (R;CN;In Chinese)
Yin Zhiwei, *See* Chen Xiaomei, 17:31873
Yin Zhoulan, *See* Cao Xiaowen, 17:32384
Yokota, Mitsuhiro, *See* Kamitani, Takuya, 17:31538
Yokuda, E., Test plan for air monitoring during the Cryogenic Retrieval Demonstration, 17:31648 (R;US)
Yoo, C.S., C_{60} transformations at high pressures, 17:31283 (R;US)
Yorke, E.D., *See* Wessels, B.W., 17:31883

Yorke, J.C., *See* Brouillet, E., 17:31799

Yoshida, K., Aerodynamic parameter determination in inlet orifice of CEA personal alpha dosimeter, 17:31553 (IA;CA)

Yoshioka, M., *See* Ida, H., 17:31502

You Ke, A search for neutrinoless double beta decay of ^{48}Ca, 17:32241 (R;CN;In Chinese)

Young, A., Rf system specifications for a linear accelerator, 17:31514 (R;US)

Young, B.K., *See* Nilsen, J., 17:31423

Young, G.R., Experimental challenges at RHIC and LHC, 17:32278 (R;US)

Young, P.G., Comprehensive nuclear model calculations: Introduction to the theory and use of the GNASH code, 17:32269 (R;US)

Young-Ju Jee, *See* Fabre de la Ripelle, M., 17:32193

Yrjoelae, J., The utilization of building maintenance feedback in Hepac-design, 17:31113 (R;FI;In Finnish)

Yu Ren, *See* Lai Dongxian, 17:31411

Yu Xianrong, *See* Ren Juqian, 17:32397

Yu Yuanqi, Numerical simulation for HT-6M tokamak electrical transient behaviours, 17:32447 (R;CN)

Yu Zhi, Transport processes of conversion electron in surface layers, 17:32371 (R;CN;In Chinese)

Yu, C.H., *See* Lee, I.Y., 17:32243

Yu, J., Evaluation of metyrapone as a radiotracer for SPECT, 17:31846 (RA;US)

Yu, S.K., *See* Kwok, C.S., 17:31894

Yuan Songliu, *See* Wang Yugui, 17:32385

Yuan, C.-P., *See* Barnett, R.M., 17:32152

Yudin, I.P., *See* Zhidkov, E.P., 17:31617

Yudin, L.A., *See* Zhabitskij, V.M., 17:31458, 17:31536

Yudin, N.P., *See* Azhgirej, L.S., 17:32330

Yuh, C.Y., Understanding of carbonate fuel cell resistance issues for performance improvement, 17:31084 (R;US)

Yunucov, M.C., A radiation-stable intensity meter for ionizing radiation based on alloyed silicon, 17:31596 (RA;US)

Yurchenko, B.N., *See* Shevchenko, L.V., 17:32345

Z

Zachau-Christiansen, B., *See* Skaarup, S., 17:31044

Zack, N.R., *See* Hunteman, W.J., 17:30770

Zafrir, H., *See* Vulkan, U., 17:31710

Zakhar'ev, B.N., 'Schroedinger equations' of higher (>2) order, 17:32033 (R;SU;In Russian)

Zakharov, B.G., *See* Kopeliovich, B.Z., 17:32324

Zaluzec, M.J., *See* Gaarenstroom, S.W., 17:31143

Zamenhof, R.G., [A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1988, 17:31775 (R;US)
  [A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1989, 17:31910 (R;US)

Zammerilli, A.M., Unconventional gas systems analysis, 17:30590 (R;US)

Zander, M.E., *See* Wright, R.M., 17:31506

Zanten, R. van, *See* Dongen, R. van, 17:31731

Zaplatin, E.N., *See* Alenitskij, Yu.G., 17:31435
  See Glazov, A.A., 17:31436, 17:31491

Zaslavskaya, E.S., Restrictions on the fluxes of relativistic cosmic photinos according to neutrino experiment KAMIOKANDE, 17:32178 (R;SU;In Russian)

Zasyslov, G.V., *See* Andzheevski, Yu.A., 17:32333

Zaveta, K., *See* Velicky, B., 17:32372

Zderad, A.J., Process designed for experimentation for increased-caliper Fresnel lenses, 17:30829 (R;US)

Zeidman, B., *See* Jackson, H.E., 17:31471

Zeman, G.H., Why change the x-ray conversion factors in ANSI N13.11?, 17:31588 (RA;US)

Zeng Wangchun, *See* Feng Mingquan, 17:30889

Zenorini, A., *See* Paganelli, G., 17:31816

Zettwoog, P., *See* Fourcade, N., 17:30611

Zganjar, E.F., *See* Mantica, P.F., 17:32245

Zhabitskij, V.M., Damping of resistive instability in UNK-1 with digital electronics in feedback, 17:31536 (R;SU;In Russian)
  Simulation of one-turn system of initial betatron beam oscillations for UNK I stage, 17:31535 (R;SU;In Russian)
  The stability of the damper system for the coherent transverse oscillations of the beam in a synchrotron, 17:31458 (R;SU;In Russian)
  The z-transform application for solving the problem of free beam oscillation damping in the accelerator, 17:31456 (R;SU;In Russian)
  Theoretical treatment of a classical transverse feedback system using Z-transform, 17:31455 (R;SU)

Zhang Boyi, Experimental study on critical heat flux with long rod bundle, 17:30886 (R;CN;In Chinese)

Zhang Cheng, The time-space structure evolution of tokamak plasma under the mutual interactions of tearing mode with transport process, 17:32398 (R;CN;In Chinese)

Zhang Chiguang, *See* Zhang Qinfen, 17:30638

Zhang Chongzhu, *See* Zhang Yingchao, 17:32506

Zhang Chunhua, *See* Gao Weisen, 17:31214

Zhang Hehu, A revolving irradiation stage, 17:31350 (R;CN;In Chinese)

Zhang Hongdi, Development of radiation preservation technique in Beijing, 17:31856 (R;CN)

Zhang Jiatai, Relativistic cloud-in-cell simulation of free-electron laser (FEL) with considering space charge effects, 17:31482 (R;CN;In Chinese)

Zhang Jirong, *See* Hu Liangyou, 17:30786

Zhang Liling, *See* Zhang Peixuan, 17:31329

Zhang Longgen, *See* Tian Jian, 17:30884

Zhang Peixuan, Preparation of rT_3 in human serum ria kit, 17:31329 (R;CN;In Chinese)

Zhang Peng, *See* Wang Shuyu, 17:30788

Zhang Qinfen, Leaching process of nuclear fuel in leaching solution at sub-boiling temperature, 17:30638 (R;CN;In Chinese)

Zhang Reilin, *See* Gao Weixiang, 17:30783

Zhang Shiguan, Nuclear safety legislation and supervision in China, 17:30918 (R;CN)

Zhang Shucheng, *See* Chen Dianshan, 17:30881

Zhang Xinwei, *See* Du Xiangwan, 17:31191

Zhang Xuejuan, *See* Gao Weixiang, 17:30783

Zhang Yingchao, The development of computer codes for NPP fuel behavior analysis at IAE, 17:32506 (R;CN;In Chinese)

Zhang Yonghui, *See* Lai Dongxian, 17:31411

Zhang Youjie, *See* Wu Shaorong, 17:31380

Zhang Zhongyue, *See* Zhang Yingchao, 17:32506

Zhang, S.Y., Rf beam loading in the Brookhaven AGS with booster injection, 17:31478 (R;US)
  Topics on RF beam control of a synchrotron, 17:31449 (R;US)
  See Soukas, A., 17:31477

Zhang, Z., Local static method for measuring radon emanation rate from porous materials, 17:31718 (IA;CA)
  Study of Tau lepton decays with ALEPH detector at LEP, 17:32175 (R;FR;In French, English)

Zhanlav, T., A numerical solution of the two-center problem, 17:32038 (R;SU;In Russian)
  Algorithm and program for solution of the Sturm-Liouville problem using the high order accuracy spline scheme, 17:32553 (R;SU;In Russian)
  On a modification of a continuous analog of the Newton method, 17:32036 (R;SU;In Russian)

Zhao Huaiguo, *See* Mou Zongze, 17:32508

Zhao Jianjun, *See* Dai Weizhi, 17:30922

Zhao Junyu, *See* Yin Xiejin, 17:32400

Zhao Shirong, *See* He Cexi, 17:31859

Zhao Wenheng, *See* You Ke, 17:32241

Zhao Wenhu, A study on ^{90}Sr adsorption by the soils around Qinshan and Daya Bay nuclear power plants, 17:31690 (R;CN;In Chinese)
  Study on the ^{90}Sr absorption by agricultural plants grown in soil from Daya Bay and Qinshan area, 17:31875 (R;CN;In Chinese)

Zhao Wenjin, Analysis of cracks and fractography on steam generator tubes, 17:30890 (R;CN;In Chinese)

Zhao Xihou, *See* Feng Mingquan, 17:30889

Zhao Xishun, The development and improvement of a fault tree program, 17:32507 (R;CN;In Chinese)

Zhao Yimin, *See* Zhou Quansheng, 17:31868

Zhao Yiming, *See* Wu Guoxin, 17:31871

Zheng Jinmei, The research on the measuring method and equipment of fast neutron absorption dosimetry and international intercomparison, 17:31544 (R;CN;In Chinese)
Zheng Sikui, *See* Zhao Wenjin, 17:30890
Zhidkov, E.P., Analysis of field space distribution of a spectrometric magnet, 17:31617 (R;SU;In Russian)
See Amirkhanov, I.V., 17:32051
See Lobanov, Yu.Yu., 17:32552
Zhidkov, P.R., On the invariant measure for the nonlinear Schroedinger equation, 17:32031 (R;SU)
Zhironkin, G.F., *See* Balagurov, A.M., 17:31578
See Barabash, I.P., 17:31616
Zhou Changchi, *See* Wu Xueyi, 17:31213
Zhou Jian-jun, Adaptive control of a refrigeration system: Feasibility analysis and controller design, 17:31098 (R;DK)
Zhou Lei, *See* Wu Shaorong, 17:31380
Zhou Licheng, *See* Yin Xiejin, 17:32400
Zhou Mingyao, *See* Tian Baiyuan, 17:31212
Zhou Quansheng, Effect of ^{60}Co radiation on the fibrinolysis and anticoagulation of endothelial cells, 17:31868 (R;CN;In Chinese)
Zhu Shoupeng, Autoradiographic visualization on the role of central ^{3}H-5-hydroxytryptamine in acupuncture analgesia, 17:31854 (R;CN;In Chinese, English)
Macro-and micro-autoradiographic study in comparison with the incorporation of ^{35}S-methionine by various tissue protein in organism, 17:31857 (R;CN;In Chinese)
Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments, 17:31877 (R;CN;In Chinese)
See Hu Qiyue, 17:31876
See Tao Feng, 17:31869, 17:31870
Zhu Weiyin, *See* Tian Jian, 17:30884
Zhu Yimin, *See* Zhang Yingchao, 17:32506
Zhu Yucan, *See* You Ke, 17:32241
Zhuchko, V.E., *See* Gehrbish, Sh., 17:31301
Zhuk, L.I., *See* Diaz Rizo, O., 17:31688
Zhumbaeva, T.T., *See* Kuropteva, Z.V., 17:31978
Zhuraev, O.M., *See* Amirkhanov, I.V., 17:32037
See Sarikov, N.A., 17:32144
Zhuravlev, V.I., On a method of solution of dispersion equations for low-energy pion-pion scattering, 17:32167 (R;SU;In Russian)
Ziegler, D.L., Preliminary assessment of RTR and visual characterization for selected waste categories, 17:30716 (R;US)
Zielinski, J.J., *See* Uckan, T., 17:32404, 17:32433
Zielke, M.M., *See* Beskid, N.J., 17:31061
Ziemann, V., The accuracy of beam-beam diagnostics for circular colliders, 17:31466 (R;US)
See Furman, M., 17:31465
See Krejcik, P., 17:31464
Zimbrick, J.D., Electron migration in 5-bromouracil-substituted DNA and oligonucleotides in irradiated aqueous solutions, 17:31996 (R;US)
Ziomek, D., *See* Regan, A.H., 17:31515
Zito, F., *See* Paganelli, G., 17:31816
Zolle, I., *See* Yu, J., 17:31846
Zorawski, A., *See* Chruscielewski, W., 17:31652
Zucchiatti, A., *See* Anghinolfi, M., 17:31530
Zucchini, R., A Polyakov action on Riemann surfaces, 17:32118 (R;FR)
Zuev, Yu.V., *See* Grigorenko, S.V., 17:31518
Zuo Jiahong, The dynamic response of the containment of the Qinshan nuclear power plant to the aircraft impact loading, 17:30888 (R;CN;In Chinese)
Zupranski, P., *See* Courtois, A., 17:32275
zur Loye, A.O., *See* Dec, J.E., 17:31157
Zverev, D.O., *See* Khandogina, E.K., 17:31973
Zvereva, S.V., *See* Khandogina, E.K., 17:31973
Zweit, J., Production of no-carrier added Yttrium-86 for radioimmuno-imaging using positron emission tomography (PET), 17:31844 (RA;US)

Subject Index

This index is arranged by subject descriptors selected from those assigned to each citation in this publication. Subject descriptors are selected from a controlled thesaurus of terms, ETDE/PUB–2, *International Energy: Subject Thesaurus.* In order to enhance indexing, subject descriptor entries generally consist of a pair of descriptors: a main term and a qualifier term. Each entry includes the full title (which may be followed by supplementary descriptive information in parentheses) and the citation number. Additional information given in parentheses indicates the document type (an abbreviation such as B for book), the country of publication (such as DE for Federal Republic of Germany), and the language if non-English.

See references guide users from synonymous terms to the descriptors selected for the concept. *See also* references indicate subject concepts that are more specific than a particular descriptor. To gain complete subject coverage, all such terms should be reviewed.

A

A CODES
ADASAGE40: Ada application development system, 17:32519 (CM;US)
AILMOE: X-section calc elastic scat resonances, 17:32541 (CM;US)
AISITE2: Parametric site requirement study, 17:32530 (CM;US)
APARNA2: 1-d integral neutron transport slab, 17:32531 (CM;IN)
Simplified modeling and code usage in the PASC-3 code system by the introduction of a programming environment: Contribution to 'International Conference on Nuclear Criticality Safety-INC'91', Oxford, UK, 9-13 September 1991, 17:32517 (R;NL)

A RESONANCES
See MESONS

A2H-1320 RESONANCES
See MESONS

A2L-1280 RESONANCES
See MESONS

ABERRATION YIELD
See MUTATION FREQUENCY

ABNORMALITIES (CHROMOSOMAL)
See CHROMOSOMAL ABERRATIONS

ABSORBED DOSES
See RADIATION DOSES

ABSORPTION REFRIGERATION CYCLE
Triple-effect absorption chiller cycles, 17:31096 (R;US)

ACCELERATORS
See also LINEAR ACCELERATORS
MESON FACTORIES
A distributed timing system for sychronizing control and data correlation, 17:31508 (R;US)
Commissioning of the Ground Test Accelerator RFQ, 17:31512 (R;US)
Designing reliability into accelerators, 17:31442 (R;US)
Electronics around the accelerators- mathematical recalls, 17:31438 (R;FR;In French)
Helical siberian snake, 17:31450 (R;FR;In French)
Real-time data archiving for GTA, 17:31507 (R;US)
Rf system description for the ground test accelerator radio-frequency quadrupole, 17:31515 (R;US)

ACCESS DENIAL SYSTEMS
See ENTRY CONTROL SYSTEMS

ACCIDENTAL INTAKE
See ACCIDENTS

ACCIDENTS
See also REACTOR ACCIDENTS
The environmental effects of the nuclear accidents in Chernobylsk (1986) and in the Ural mountains, 17:30965 (RA;IL;In Hebrew)
The steam explosion potential for an unseated SRS reactor septifoil, 17:31037 (R;US)

ACCOUNTABILITY (NUCLEAR MATERIALS)
See NUCLEAR MATERIALS MANAGEMENT

ACES
See QUARKS

ACETYLENE
Interchain coupling and 3D modeling of trans-polyacetylene, 17:32361 (R;US)

ACID ELECTROLYTE FUEL CELLS
Advanced water-cooled phosphoric acid fuel cell development, 17:31082 (R;US)

ACID RAIN
Finnish research project on acidification (HAPRO), 17:31683 (R;FI)

ACOUSTIC EMISSION TESTING
Acoustic monitoring techniques for corrosion degradation in cemented waste canisters, 17:30691 (R;FR)

ACOUSTICS
Nonlinear stability of combustion-driven acoustic oscillations in resonance tubes, 17:32062 (R;US)

ACPR REACTOR
An analysis of radionuclide behavior in water pools during accidents at the Annular Core Research Reactor, 17:31028 (R;US)

ACQUIRED IMMUNODEFICIENCY SYNDROME
See AIDS

ACRR REACTOR
See ACPR REACTOR

ACTINIDES
See also AMERICIUM
NEPTUNIUM
PLUTONIUM
THORIUM
URANIUM
Chemistry and Materials Science progress report, first half FY 1992: Weapons-Supporting Research and Laboratory Directed Research and Development, 17:31243 (R;US)
Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)

ADA
ADASAGE40: Ada application development system, 17:32519 (CM;US)

ADENOCARCINOMAS
See CARCINOMAS

ADIABATIC APPROXIMATION
Magnus approximation in the adiabatic picture, 17:32025 (R;FR)

ADSORBENTS
See also MOLECULAR SIEVES
Anion-exchange resin-based desulfurization process: Quarterly technical progress report, April 1, 1992–June 30, 1992, 17:30864 (R;US)
The MAGSORB process for bulk separation of carbon dioxide: Final report, 17:31296 (R;US)

ADSORPTION
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)

ADU
Preparation of uranium dioxide powder: Process for production coarse particle ADU precipitate in pilot plant, 17:30634 (R;CN;In Chinese)
ADVANCED PHOTON SOURCE
Utilization of databases to manage resources, 17:31473 (R;US)
AGE ESTIMATION
Evidence for the origin of Ca in land snails living on basalts (Golan Heights) from their strontium isotopic composition, 17:31714 (IA;IL)
AIDS
The use of a scanning proton microprobe in AIDS research, 17:31852 (IA;AU)
AIR
Air monitoring in the Arctic: 1980-90, 17:31672 (R;SE)
Effects of cooling-air injection on secondary flows and losses in a turbine cascade, 17:31400 (R;JP)
SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)
Summary of the March 25–26, 1991 atmospheric model working meeting: Hanford Environmental Dose Reconstruction Project, 17:31999 (R;US)
Test plan for air monitoring during the Cryogenic Retrieval Demonstration, 17:31648 (R;US)
AIR CONDITIONERS
Triple-effect absorption chiller cycles, 17:31096 (R;US)
AIR CONDITIONING
Trend in energy demand in factory air conditioning.: Analysis by a questionnaire of actual situation of air conditioning for cooling, 17:31130 (R;JP;In Japanese)
AIR FILTERS
Spray nozzle pattern test for the DWPF HEME task technical plan (Defense Waste Processing Facility (DWPF), High-Efficiency Mist Eliminators (HEME)), 17:30744 (R;US)
AIR FLOW
Effects of cooling-air injection on secondary flows and losses in a turbine cascade, 17:31400 (R;JP)
Estimation of air flow profile based on state measurements, 17:31372 (R;FI)
Tributary and gap nighttime air flow comparisons, 17:31661 (R;US)
AIR POLLUTION
See also INDOOR AIR POLLUTION
Dense-gas dispersion advection-diffusion model, 17:31675 (R;US)
Measurements, classification and valorization of environmental problems: Case rural area of Oulu, 17:31667 (R;FI;In Finnish)
Research programme for air quality 1986-1990, 17:31681 (R;FI;In Finnish)
AIR POLLUTION CONTROL
Quantum chemical methods of V_2O_5-TiO_2 catalysts, 17:31666 (R;SE;In Swedish, English)
Report on the enforcement of the air pollution control act in the province of central Finland. Part 2: Development trends in pollutant emissions and air quality, pollution control costs, 17:31069 (R;FI;In Finnish)
AIR POLLUTION MONITORING
Plutonium finishing plant comparison with 40 CFR 61, subpart H, and other referenced guidelines for stack 291-Z-1, 17:30757 (R;US)
AIR-WATER INTERACTIONS
[Studies of ocean predictability at decade to century time scales using a global ocean general circulation model in a parallel competing environment]: Progress report, 17:32515 (R;US)
AIRBORNE PARTICLES
See PARTICULATES
AIRBORNE PARTICULATES
See PARTICULATES
AIRCRAFT ACCIDENTS
See ACCIDENTS
AIRPORTS
The problem with security: Public perception versus reality, 17:32485 (R;US)
ALARM DOSEMETERS
See RADIATION MONITORS
ALARM SYSTEMS
See also INTRUSION DETECTION SYSTEMS
Need for the detection of guideway misalignment and foreign objects, 17:31181 (RA;US)
Software overview for the Annunciator Communication System: Interim report: Revision, 17:31626 (R;US)
ALASKA
Analysis of reservoir heterogeneities due to shallowing-upward cycles in carbonate rocks of the Pennsylvanian Wahoo Limestone of Northeastern Alaska: Annual report, October 1990–September 1991, 17:30560 (R;US)
ALASKA POWER ADMINISTRATION
Alaska Power Administration federal power program, Juneau, Alaska: Fiscal year 1991, 17:31046 (R;US)
ALCOHOL FUELS
Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)
ALGORITHMS
A weighted iterative algorithm for neuromagnetic imaging, 17:31850 (R;US)
ALKALI METAL COMPOUNDS
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
Quantitative determination of elements and identification of compounds of alkali halides by depth-sensitive secondary neutral mass spectrometry, 17:31303 (R;DE;In German)
ALKYLATED AROMATICS
See also TOLUENE
Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report, 17:31131 (R;US)
ALLOY NUCLEAR FUELS
Molten aluminum alloy fuel fragmentation experiments, 17:30997 (R;US)
ALLOY-1915
See ALUMINIUM BASE ALLOYS
ALLOY-214X
See ALUMINIUM BASE ALLOYS
ALLOY-50KH4N6G12F2V
See CHROMIUM ALLOYS
ALLOY-79NM
See NICKEL BASE ALLOYS
ALLOY-D-9
Influence of cold work level on the irradiation creep and creep rupture of titanium-modified austenitic stainless steels, 17:31237 (R;US)
ALLOY-GE
See COPPER ALLOYS
ALLOY-GMR-235
See NICKEL BASE ALLOYS
ALLOY-HD-8077
See NICKEL BASE ALLOYS
ALLOY-KH20N80T
See NICKEL BASE ALLOYS
ALLOY-KHN77TYU
See NICKEL BASE ALLOYS
ALLOY-M-252
See NICKEL BASE ALLOYS
ALLOY-MA-754
See NICKEL BASE ALLOYS
ALLOY-MA-956
See IRON BASE ALLOYS
ALLOY-MM-0011
See NICKEL BASE ALLOYS
ALLOY-WAZ-16
See NICKEL BASE ALLOYS
ALLOY-ZR98SN-4
A new method for residual stress distribution - analysis of corroded zircaloy-4 cladding, 17:31208 (R;FR)

Determination of a crystalline orientation distribution function based on inverted poles figures principle for hexagonal crystalline symmetry. Macroscopic physical properties prediction, 17:31206 (R;FR;In French)

ALLOYS

See also ALUMINIUM ALLOYS
CHROMIUM ALLOYS
COBALT ALLOYS
COPPER ALLOYS
GERMANIUM ALLOYS
HEAT RESISTING ALLOYS
IRON ALLOYS
LITHIUM ALLOYS
MAGNESIUM ALLOYS
NICKEL ALLOYS
SILICON ALLOYS
YTTRIUM ALLOYS
ZIRCONIUM ALLOYS

Experimental studies of cascade phenomena in metals, 17:31203 (R;US)

T metal analytical samples, 17:31224 (R;US)

ALPHA SPECTROMETERS

The Pylon 190: A novel filter calibration standard for alpha spectrometry, 17:31558 (IA;CA)

ALPHA-BEARING WASTES

α-sealed transfer device and portable plastic film sealers, 17:31349 (R;CN;In Chinese)

Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)

Nondestructive assays of 55-gallon drums containing uranium and transuranic waste using passive-active shufflers, 17:30709 (R;US)

Small-scale brine inflow experiments: Data report through June 6, 1991, 17:30718 (R;US)

Steady-state saturation profiles for linear immiscible fluid displacement in porous media, 17:30720 (R;US)

Waste crate counter design, 17:30708 (R;US)

ALUMINIA

See ALUMINIUM OXIDES

ALUMINIUM

Aluminum oxide film thickness and emittance, 17:31038 (R;US)

Characterizing laser fusion welded aluminum using synchrotron x-ray microtomography, 17:31406 (R;US)

Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991, 17:31270 (R;US)

Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)

Wastage-resistant FBC evaporator tubing through microalloying, 17:31223 (R;US)

ALUMINIUM 26

^{22}Na and ^{26}Al production in nova outbursts, 17:32060 (R;US)

ALUMINIUM 27 TARGET

Charge-exchange cross sections of the $^3H \rightarrow ^3He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)

ALUMINIUM ALLOYS

See also ALUMINIUM BASE ALLOYS

Influence of dilute impurities on the evolution of defect cascades in nickel, 17:31201 (R;US)

Ordering energies and mechanisms in β-phase NiAl, 17:31215 (R;US)

ALUMINIUM BASE ALLOYS

Interactions between drops of molten Al-Li alloys and liquid water, 17:31029 (R;US)

Materials compatibility and corrosion issues for accelerator transmutation of waste, 17:30704 (R;US)

Molten aluminum alloy fuel fragmentation experiments, 17:30997 (R;US)

The effect of precipitate forming elements in Al 4.5% Mg alloys on the measured acoustic emission and on Lueders band deformation, 17:31239 (R;US)

The influence of processing atmosphere on twin-roll melt-spinning of aluminum alloys, 17:31228 (R;US)

ALUMINIUM NITRATES

Measurements of $Al(NO_3)_3$ activities in aqueous nitrate solutions, 17:31310 (R;US)

ALUMINIUM OXIDES

Aluminum oxide film thickness and emittance, 17:31038 (R;US)

Fabrication of high temperature materials by exothermic synthesis and subsequent dynamic consolidation, 17:31276 (PA;US)

Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)

Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)

Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)

ALUMINIUM SILICATES

Binding and catalytic reduction of NO by transition metal aluminosilicates: Technical progress report, March 1992–May 1992, 17:30483 (R;US)

ALUMINUM

See ALUMINIUM

ALVEOLI (PULMONARY)

See LUNGS

AMERICIUM

Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)

Evaluation of actinide volatilities in mixed waste processors, 17:30735 (R;US)

Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)

Study of the extraction and the purification of americium and trivalent actinides contained in effluents with supported liquid membranes, 17:31333 (R;FR;In French)

AMMONIUM COMPOUNDS

See also AMMONIUM HALIDES

Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)

Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)

Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)

Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst, 17:30430 (R;US)

AMMONIUM DIURANATE

See ADU

AMMONIUM HALIDES

Thermal analysis of alkylammonium salts, 17:31269 (R;US)

ANALOG-TO-DIGITAL CONVERTERS

VKP-6 programmed time-to-digital converter with additional functions, 17:31412 (R;SU;In Russian)

ANEMOMETERS

The cup anemometer and other exciting instruments, 17:30861 (R;DK)

ANGIOGRAPHY

See BIOMEDICAL RADIOGRAPHY
BLOOD VESSELS

ANIMAL CELLS

See also TUMOR CELLS

Risk assessment from heterogeneous energy deposition in tissue, the problem of effects from low doses of ionizing radiation, 17:31878 (RA;US)

ANNIHILATION OPERATORS

Coherent state operators and n-point invariants for $U_q(sl(2))$, 17:32026 (R;FR)

ANNULAR CORE PULSE REACTOR

See ACPR REACTOR

ANNULAR CORE RESEARCH REACTOR

See ACPR REACTOR

ANTIBIOTICS
Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)
ANTIBODIES
See also MONOCLONAL ANTIBODIES
Pharmacokinetics of an anti-CEA antibody radiolabeled with ^{111}In via DTPA and with ^{99m}Tc via two direct labeling methods: A comparison in patients, 17:31831 (RA;US)
ANTIFERROMAGNETISM
Nonclassical disordered phase in the strong quantum limit of frustrated antiferromagnets, 17:32389 (R;XA)
ANTINEOPLASTIC DRUGS
Tc-99m-labeled adriamycin, 17:31781 (RA;US)
ANTRIM SHALES
See BLACK SHALES
APA
See ALASKA POWER ADMINISTRATION
APPENDIX (VERMIFORM)
See LARGE INTESTINE
APPLICATORS (RADIOTHERAPY)
See RADIATION SOURCES
APS STORAGE RING
See ADVANCED PHOTON SOURCE
AQUATIC ECOSYSTEMS
See also WETLANDS
Radioecology in Nordic limnic systems - present knowledge and future prospects, 17:31757 (R;SE)
AQUEOUS SOLUTIONS
EQ3/6 V7.0: Geochemical modeling of aqueous systems, 17:32525 (CM;US)
EQ3/6 V7.1: Geochemical modeling of aqueous systems, 17:32526 (CM;US)
AQUIFERS
Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)
ARAB REPUBLIC OF EGYPT
See EGYPTIAN ARAB REPUBLIC
ARC WELDING
An integrated optical sensor for GMAW feedback control, 17:31358 (R;US)
ARCTIC REGIONS
Air monitoring in the Arctic: 1980-90, 17:31672 (R;SE)
State of the Arctic Environment: Report on oil pollution, 17:30580 (I;NO)
ARGON 36 TARGET
Measurement of the cross section of the ^{36}Ar(n,α)^{33}S and ^{50}V(n,p)^{50}Ti reactions induced by thermal neutrons, 17:32333 (R;SU;In Russian)
ARGON IONS
Experimental study of interactions of highly charged ions with atoms at keV energies: Progress report, July 1, 1991–June 30, 1992, 17:32357 (R;US)
ARIZONA
Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)
ARMS CONTROL
Constitutional and legal implications of arms control verification technologies, 17:31195 (R;US)
INF and IAEA: A comparative analysis of verification strategy: [Final report], 17:31197 (R;US)
Nuclear employment policy and optimal exchange strategies, 17:31194 (R;US)
The IAEA system and experience as a model for Information Management under the Chemical Weapons Convention, 17:31196 (R;US)
ARRAY PROCESSORS
Memory access in shared virtual memory, 17:32502 (R;US)
ScaLAPACK: A scalable linear algebra library for distributed memory concurrent computers, 17:32514 (R;US)
The performance realities of massively parallel processors: A case study, 17:32556 (R;US)
ARSENIC COMPOUNDS
See also ORGANIC ARSENIC COMPOUNDS
Control of mercury emissions from coal-fired boilers, 17:30475 (R;US)
ARSONIUM COMPOUNDS
See ARSENIC COMPOUNDS
ARTIFICIAL INTELLIGENCE
A research on applications of qualitative reasoning techniques in Human Acts Simulation Program, 17:31359 (R;JP)
ASHES
See also FLY ASH
Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992, 17:30552 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
Oil shale ash-layer thickness and char combustion kinetics, 17:30602 (R;US)
Performance evaluation of micronized-magnetite cycloning at high relative densities of separation, 17:30427 (R;US)
ASSE SALT MINE
Progress report of the ECN contribution to the experiments in the HAW project: 1st half year 1991, 17:30681 (R;NL)
Research on backfilling and sealing of Rooms and Galleries in a repository in salt, 17:30696 (R;FR;In German)
ASSETS
See FINANCIAL DATA
ATF TORSATRON
Biasing experiments on the Advanced Toroidal Facility, 17:32404 (R;US)
Effects of limiter biasing on the ATF torsatron, 17:32433 (R;US)
ATLANTIC OCEAN
See also NORTH SEA
Marine geophysical studies in the Northern Atlantic with emphasis on sedimentation, crustal structure and subsidence, 17:30565 (I;NO)
ATMOSPHERIC CHEMISTRY
A comparison of different chemical models for use in regional simulations of air pollution, 17:31659 (R;SE;In Swedish)
ATMOSPHERIC CIRCULATION
Modeling the dispersion of tracer plumes in the Colorado front range boundary layer during night- and day-time conditions, 17:31678 (R;US)
ATOMIC BOMBS
See NUCLEAR WEAPONS
ATOMIC EXPLOSIONS
See NUCLEAR EXPLOSIONS
ATOMIC FLUORESCENCE SPECTROSCOPY
See FLUORESCENCE SPECTROSCOPY
ATOMIC WEAPONS
See NUCLEAR WEAPONS
AUDITS
Computer assisted audit techniques for UNIX (UNIX-CAATS), 17:32509 (R;US)
AUSTENITIC STEELS
See also STEEL-CR17NI12MO3-L
STEEL-CR18NI10TI
STEEL-CR19NI10
Isotopic tailoring with ^{59}Ni to study the effect of helium on microstructural evolution and mechanical properties of neutron-irradiated Fe-Cr-Ni alloys, 17:32466 (R;US)
AUTOMOBILE EFFICIENCY STANDARDS
See AUTOMOBILES
STANDARDS
AUTOMOBILES
Driving a car with custom-designed fuzzy inferencing VLSI chips and boards, 17:32511 (R;US)
Fitting catalytic converters on cars, 17:31664 (I;DK;In Danish)
Motor vehicle fuel economy, the forgotten HC control stragegy?, 17:31187 (R;US)
AUTOMOTIVE FUELS
Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)

B

B CODES
BOILER PERF MODEL3.0: Fossil-fired boilers, 17:32522 (CM;US)

B MESONS
Beauty physics-CKM matrix, 17:32174 (R;FR;In French)

BACKFILLING
Research on backfilling and sealing of Rooms and Galleries in a repository in salt, 17:30696 (R;FR;In German)

BACKGROUND RADIATION
Design of TOPAZ masking system using EGS4, 17:31501 (RA;JP;In Japanese)
Measurement of the radiation-level at the site of the Dutch National Institute for Public Health and Environmental Hygiene (RIVM) during the year 1990, 17:31731 (R;NL;In Dutch)

BACTERIAL DISEASES
A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG, 17:31838 (RA;US)
Tissue distribution and biokinetics of radiolabeled proteins in rats with a focal infection, 17:31918 (RA;US)

BALTIC SEA
The conditions of the seas around Sweden: Report from the activities in 1991, 17:31756 (R;SE;In Swedish, English)

BANACH SPACE
See also HILBERT SPACE
Existence of viable solutions for nonconvex-valued differential inclusions in Banach spaces, 17:32022 (R;XA)

BARIUM OXIDES
Flux pinning in oxygen-depleted $YBa_2Cu_3O_{7-y}$ single crystals, 17:31264 (R;US)
High-temperature deformation and diffusion in oxides, 17:31245 (R;US)

BARIUM SILICATES
The standard molar enthalpies of formation of $BaSiO_3$(s) and Ba_2SiO_4(s), 17:30960 (R;NL)

BARYON NUMBER
Baryon and lepton number violation in the standard model at high energy, 17:32122 (R;US)

BARYON NUMBER 2 RESONANCES
See DIBARYONS

BARYON RESONANCES
See BARYONS

BARYONS
See also CHARMED BARYONS
DIBARYONS
HYPERONS
N*BARYONS
NUCLEONS
Clusters in the nuclear model of chiral field solitons, 17:32235 (RA;SU)

BATTERIES (ELECTRIC)
See ELECTRIC BATTERIES

BAUXITE
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)

BEAM BUNCHING
A simple model for SLC positron stability issues, 17:31464 (R;US)
Focusing characteristics of an accelerating structure with noncircular beam holes, 17:31460 (R;FR)
Prompt bunch by bunch synchrotron oscillation detection via a fast phase measurement, 17:31497 (RA;JP)
Recent improvements and new possibilities of the Ganil facility, 17:31432 (R;FR)

BEAM DYNAMICS
See also BEAM BUNCHING
BEAM-BEAM INTERACTIONS
BETATRON OSCILLATIONS
SYNCHROTRON OSCILLATIONS
Alternating-phase focusing: A model to study nonlinear dynamics, 17:31445 (R;US)
Comparison of computational methods and results concerning the simulation of IH structures with the codes LORAS and DYNAC, 17:31452 (R;FR)
Topics on RF beam control of a synchrotron, 17:31449 (R;US)

BEAM EXTRACTION
Calculation of the beam extraction system from the U-120K cyclotron, 17:31489 (R;SU;In Russian)

BEAM INJECTION
See also ION BEAM INJECTION
An engineering upgrade of the CWDD injector, 17:31472 (R;US)
Design study of a 1 MV, 4 A, D- test bed in european community, 17:32443 (R;FR)
Dione status report, 17:32275 (R;FR)
Recent improvements and new possibilities of the Ganil facility, 17:31432 (R;FR)
Rf beam loading in the Brookhaven AGS with booster injection, 17:31478 (R;US)

BEAM MONITORING
Beam position monitor using a reentrant coaxial cavity, 17:31496 (RA;JP)

BEAM MONITORS
A non interceptive heavy ion beam profile monitor based on residual gas ionization, 17:31484 (R;FR)
Longitudinal impedance of capacitive pick-up electrodes: Calculations and comparison with measurements, 17:31474 (R;US)

BEAM POSITION
Log-ratio beam position monitoring at 425 MHz, 17:31510 (R;US)

BEAM PROFILES
Image processing and computer controls for video profile diagnostic system in the ground test accelerator (GTA), 17:31506 (R;US)

BEAM STRIPPERS
Dione status report, 17:32275 (R;FR)

BEAM TRANSPORT
Commissioning of the Ground Test Accelerator Intertank Matching Section, 17:31513 (R;US)

BEAM WIDTHS
See BEAM PROFILES

BEAM-BEAM INTERACTIONS
Beam-beam diagnostics from closed-orbit distortion, 17:31465 (R;US)
The accuracy of beam-beam diagnostics for circular colliders, 17:31466 (R;US)
Tune spread due to magnetic multipoles in RHIC, 17:31447 (R;US)

BEAM-FOIL SPECTROSCOPY
See ION SPECTROSCOPY

BEAM-GAS SPECTROSCOPY
See ION SPECTROSCOPY

BEAMS
See also CLUSTER BEAMS
COLLIDING BEAMS
ION BEAMS
MOLECULAR BEAMS
PHOTON BEAMS
POLARIZED BEAMS
Proceedings of the international conference on evolution in beam applications, 17:30789 (I;JP)

BEAUTY MESONS
Beauty physics-CKM matrix, 17:32174 (R;FR;In French)

BEAUTY PARTICLES
See also B MESONS
BEAUTY MESONS
Heavy flavour physics at LEP, 17:32170 (R;FR)

BELL INEQUALITY
See BELL THEOREM

BELL THEOREM
Bell-type experiments and the concept of locally stochastic causality, 17:32046 (R;NO)

BELLOWS
ASST Interconnect Region single phase pressure tests, 17:31528 (R;US)

BENCHMARKS
- LFK: Livermore FORTRAN kernel computer test, 17:32527 (CM;US)
- SWEB: Scientific Workstation Evaluation Benchmark, 17:32523 (CM;US)

BENTONITE
- Sealing performance of bentonite and bentonite/crushed rock borehole plugs, 17:30710 (R;US)
- Swelling pressure, water uptake, and permeability of 70/30 crushed salt/bentonite, 17:30721 (R;US)

BENZENE
- Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991, 17:30437 (R;US)

BETA BEAMS (ELECTRONS)
- *See* ELECTRON BEAMS

BETA BEAMS (POSITRONS)
- *See* POSITRON BEAMS

BETA PARTICLES
- A model for electron and beta energy deposition within trabecular bone, 17:31895 (RA;US)

BETATRON OSCILLATIONS
- Linear synchro-betatron resonances, driven by beam-beam interaction, 17:31532 (R;SU)
- The z-transform application for solving the problem of free beam oscillation damping in the accelerator, 17:31456 (R;SU;In Russian)
- Theoretical treatment of a classical transverse feedback system using Z-transform, 17:31455 (R;SU)

BETATRONS
- Tandem betatron, 17:31439 (PA;US)

BETHE-SALPETER EQUATION
- Numerical method of solution of a boundary value problem for the coupled integro-differential equations (The Bethe-Salpeter equation), 17:32037 (R;SU;In Russian)

BINARY ALLOY SYSTEMS
- Calculation of binary phase diagrams between the actinide elements, rare earth elements, and transition metal elements, 17:31238 (R;US)
- Chemistry and Materials Science progress report, first half FY 1992: Weapons-Supporting Research and Laboratory Directed Research and Development, 17:31243 (R;US)
- Ingot homogenization, 17:31217 (R;US)

BIOASSAY
- The establishment of a national calibration centre for practical standards for bioassay and in vivo monitoring, 17:31954 (IA;CA)

BIOCENOSES
- *See* ECOSYSTEMS

BIOCHEMICAL ACTIVITY
- *See* BIOCHEMISTRY

BIOCHEMISTRY
- A physico-chemical study of some areas of fundamental significance to biophysics: Annual report, 1991–1992, 17:31760 (R;US)
- A physico-chemical study of some areas of fundamental significance to biophysics: Three-year comprehensive report, 1989–1992, 17:31761 (R;US)

BIODEGRADATION
- Effects of lag and maximum growth in contaminant transport and biodegradation modeling, 17:31727 (R;US)
- Three-dimensional bioremediation modeling in heterogeneous porous media, 17:31728 (R;US)

BIOGAS
- *See* METHANE

BIOGEOCENOSES
- *See* ECOSYSTEMS

BIOLOGICAL REACTORS
- *See* BIOREACTORS

BIOLOGICAL REPAIR
- *See also* DNA REPAIR
  - PHOTOREACTIVATION
- Effect of millimeter radiation on radiationinduced repair of genome conformation state, 17:31957 (IA;SU;In Russian)

BIOLOGICAL TESTING
- *See* BIOASSAY

BIOMASS
- Conductivity measurements on dolomite at reaction conditions, 17:30804 (R;SE)
- Electricity from biomass: A development strategy, 17:30801 (R;US)
- Growing energy: A national economy analysis of energy from arable land, 17:30811 (R;SE;In Swedish)

BIOMASS CONVERSION PLANTS
- Report on technical measurements concerning measurement of the suction of tanks at Fangel biomass conversion plant, 17:30803 (I;DK;In Danish)

BIOMASS PLANTATIONS
- Biomass fuels - effects on the carbon dioxide budget, 17:30813 (R;SE)

BIOMEDICAL RADIOGRAPHY
- Risk assessment - benefit in scanning medical examination for early detection of breast cancer by means of mammography, 17:31927 (RA;IL;In Hebrew)

BIOPHYSICS
- A physico-chemical study of some areas of fundamental significance to biophysics: Annual report, 1991–1992, 17:31760 (R;US)
- A physico-chemical study of some areas of fundamental significance to biophysics: Three-year comprehensive report, 1989–1992, 17:31761 (R;US)

BIOREACTORS
- Simulation of bioreactors: A literature review, 17:30800 (R;FI)

BISMUTH 209 TARGET
- The α-decay properties of light uranium isotopes, 17:32244 (R;US)

BISMUTH OXIDES
- Activation energy and critical current density in Bi-Sr-Ca-Cu-O, 17:31247 (R;US)
- Flux creep in fluorine-doping Bi-Pb-Sr-Ca-Cu-O bulk superconductor, 17:32384 (R;CN;In Chinese)
- Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations, 17:31259 (R;US)
- Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)

BITTER SPAR
- *See* DOLOMITE

BITUMENS
- Utilizing asphaltene pyrolysis to predict pyrolysis kinetics of heavy crude oil and extractable native bitumen, 17:30603 (R;US)

BITUMINOUS COAL
- ^{31}P NMR analysis of coal moieties bearing -OH, -NH and -SH functions: Quarterly report, January 1, 1990–March 31, 1990, 17:30468 (R;US)
- ^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, January 1, 1991–March 31, 1991, 17:30466 (R;US)
- ^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, October 1, 1990–December 31, 1990, 17:30467 (R;US)
- ^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Quarterly report, June 1, 1991–August 31, 1991, 17:30465 (R;US)
- An EPR spin probe method for characterizing changes in the accessible regions of coal upon oxidation, 17:30461 (R;US)
- Formation and retention of methane in coal: Final report, 17:30470 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991, 17:30477 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990, 17:30476 (R;US)

Sulfur removal from high-sulfur Illinois coal by low-temperature perchloroethylene (PCE) extraction: Technical report, December 1, 1991–February 29, 1992, 17:30458 (R;US)
The floatability of mineral and coal pyrite, 17:30423 (RA;US)

BLACK SHALES
Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report, 17:30589 (R;US)

BLADDER
Contrast-enhanced computed tomography of the primary tumor in muscle invasive carcinoma of the urinary bladder, 17:31851 (I;NO)
Point-pair distributions for internal dosimetry, 17:31897 (RA;US)
Radiation dosimetry for Tc-99m MAG3 in adults and children, 17:31903 (RA;US)

BLADES (TURBINES)
See TURBINE BLADES

BLANKETS (BREEDING)
See BREEDING BLANKETS

BLAST FURNACES
Model for blast furnace on-line simulation. Part 4: Application of the model to prediction, 17:31198 (R;FI)

BLOOD
See also BLOOD CELLS
BLOOD PLASMA
Absorbed dose calculations to blood and blood vessels for internally deposited radionuclides, 17:31891 (RA;US)
Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32, 17:31993 (RA;US)
Pb-210 concentrations in the blood of ground workers and underground miners of zinc-lead mine, 17:31950 (IA;CA)

BLOOD CELLS
See also BLOOD PLATELETS
ERYTHROCYTES
LEUKOCYTES
The disbalance of microelements in the blood of irradiated animals and its normalization with ceruloplasmin, 17:31983 (R;UA;In Russian)

BLOOD PLASMA
The disturbance of micro element exchange in different blood of animals irradiated by different radiation sources, 17:31984 (RA;UA;In Russian)

BLOOD PLATELETS
Effects of ^{60}Co γ-ray irradiation on human platelets, 17:31871 (R;CN;In Chinese)
Quantitation of comparative thrombogenicity of dog, pig and human platelets (PLT) in a hemodialyzer (HD), 17:31840 (RA;US)
Quantitation of thrombogenicity of technetium-99M and indium-111 labeled canine platelets (PLT) in a hemodialyzer (HD), 17:31839 (RA;US)

BLOOD VESSELS
Absorbed dose calculations to blood and blood vessels for internally deposited radionuclides, 17:31891 (RA;US)
Effect of ^{60}Co radiation on the fibrinolysis and anticoagulation of endothelial cells, 17:31868 (R;CN;In Chinese)

BLUE-GREEN ALGAE
See CYANOBACTERIA

BODY WAVES P (SEISMIC)
See SEISMIC P WAVES

BOILERS
See also FLUIDIZED BED BOILERS
REFUSE-FUELED BOILERS
BOILER PERF MODEL3.0: Fossil-fired boilers, 17:32522 (CM;US)
The corrosion on the surfaces of airpreheaters and electrostatic precipitators in peat-fired boilers, 17:30553 (R;FI;In Finnish)

BOILING WATER COOLED AND MODERATED REACTOR
See BWR TYPE REACTORS

BONDING
Nondestructive testing of bonding of low enriched uranium elements by using ultrasonic phase-amplitude technique, 17:30952 (R;CN)

BONE MARROW
Enhancement of radiation dose to the bone marrow from backscattering of electron sources, 17:31894 (RA;US)

BONE MARROW CELLS
Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments, 17:31877 (R;CN;In Chinese)

BONES
See SKELETON

BOOSTERS (PARTICLE)
See PARTICLE BOOSTERS

BOREHOLES
Comparative analysis of borehole interaction in the HAW test field, 17:30680 (R;NL)
Convergence measurements in a 300 m deep borehole in rock salt, 17:30684 (R;NL)
Description of hydrogeological data in SKB's database GEOTAB. Version 2, 17:30756 (R;SE)
Finite element analyses of a heater-interruption in the HAW test field, 17:30682 (R;NL)
Ovality of the steel lining in the HAW test field, 17:30683 (R;NL)
[In-situ permeability determination and fracture characterization using elastic waves]: Progress report, 17:30562 (R;US)

BORON
Study of high energy ion implantation of boron and oxygen in silicon, 17:32376 (R;FR;In French)

BORON 10
A Monte Carlo simulation of boron neutron capture reactions in cells - Microdosimetric aspects, 17:31774 (RA;US)

BORON ISOTOPES
See also BORON 10
Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments, 17:31706 (IA;IL)

BORON NITRIDES
Application of the Rutherford backscattering analysis (RBS analysis) for detecting heavy impurity elements in pBN crucible materials. Final report, 17:31298 (I;DE;In German)

BOROSILICATE GLASS
Irradiation test of borosilicate glass burnable poison, 17:30889 (R;CN;In Chinese)
What do we know about nuclear waste glass performance in the repository near field?, 17:30725 (RA;SE)

BOROSILICATES
See BOROSILICATE GLASS

BOSON-FERMION SYMMETRY
Quantum discrete gauge models with bosonic and fermionic degrees of freedom, 17:32108 (R;SU)

BOTTOM MESONS
See BEAUTY MESONS

BOTTOM PARTICLES
See BEAUTY PARTICLES

BOUND STATE
Potential harmonic expansion for atomic wave functions, 17:32354 (R;FR)

BOUNDARIES (GRAIN)
See GRAIN BOUNDARIES

BOUNDARY LAYERS
See also PLASMA SCRAPE-OFF LAYER
Structure of the nocturnal boundary layer over a complex terrain, 17:31680 (R;US)

BOUNDARY VALUE PROBLEMS
See BOUNDARY-VALUE PROBLEMS

BOUNDARY-VALUE PROBLEMS
Computation of Green function of the Schroedinger-like partial differential equations by the numerical functional integration, 17:32552 (R;SU)

BOVINE
See CATTLE

BRACKISH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS

BRAIN
An animal model for radiopharmaceutical research (Didelphis albiventis) in HM-PAO-Tc-99m use, 17:31843 (RA;US)

Analysis of [F-18]-L-6-fluorodopa and metabolites in plasma for PET studies, 17:31845 (RA;US)
Autoradiographic visualization on the role of central ^{3}H-5-hydroxytryptamine in acupuncture analgesia, 17:31854 (R;CN;In Chinese, English)
Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
Correlation of lipophilicity to biodistribution of Tc-99m labelled aminothiols, 17:31782 (RA;US)
Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on platelet kinetics in Beagle dogs: Comparison with In-111 labeled platelets, 17:31913 (RA;US)
Elevated brain uptake of ^{59} citrate: Correlation with the critical period of brain development in experimental phenylketonuria, 17:31920 (RA;US)
Interaction of triazolam with central type benzodiazepine receptors studied in living baboons using positron emission tomography, 17:31798 (RA;US)
Intrinsic efficacies of benzodiazepine receptor ligands evaluated in vivo by positron emission tomography in the primate brain, 17:31799 (RA;US)
Quantification of ^{76}Br-bromolisuride binding to central dopamine D2 receptors studied in baboon by PET, 17:31797 (RA;US)
The preparation and biodistribution of secondary Tc-HMPAO, 17:31779 (RA;US)
Three-step ^{99m}Tc-biotin immunoscintigraphy in the diagnosis of glioma patients, 17:31816 (RA;US)
Tissue localization of ^{125}I-Triiodothyronine in the periorbital area of mice: A microautoradiographic study, 17:31916 (RA;US)

BREASTS
See MAMMARY GLANDS

BREEDING BLANKETS
LIPSIE experiment: Pb17Li irradiation in water loop with on line tritium measurements, 17:32441 (R;FR)
Modeling of tritium behavior in Li_2O, 17:32438 (R;US)

BREEDING PELLETS
Canadian ceramic breeder sphere-pac technology: Capability and recent results, 17:32445 (R;CA)

BREMSSTRAHLUNG (MAGNETIC)
See SYNCHROTRON RADIATION

BRINES
Small-scale brine inflow experiments: Data report through June 6, 1991, 17:30718 (R;US)

BRONCHOGENIC CARCINOMA
See CARCINOMAS

BROOKHAVEN AGS
Longitudinal impedance of capacitive pick-up electrodes: Calculations and comparison with measurements, 17:31474 (R;US)
Preliminary study of AC power feeders for AGS booster, 17:31479 (R;US)
Rf beam loading in the Brookhaven AGS with booster injection, 17:31478 (R;US)
The RF beam control system for the Brookhaven AGS synchrotron, 17:31475 (R;US)
The operational status of the Booster injector for the AGS accelerator complex at BNL, 17:31476 (R;US)

BROOKHAVEN RHIC
Experimental challenges at RHIC and LHC, 17:32278 (R;US)
RHIC status, 17:31427 (R;US)
Tune spread due to magnetic multipoles in RHIC, 17:31447 (R;US)

BUBBLES
The pendulum model for wake size prediction for a gas bubble in liquid-solid suspensions, 17:31382 (RA;US)

BUCKLING (STRUCTURAL)
See DEFORMATION

BUILDING MATERIALS
See also CEMENTS
CONCRETES
Program overview of the hollow clay tile wall program, 17:31368 (R;US)
Protocol for determination of chemical warfare agent simulant movement through porous media, 17:31642 (R;US)
White paper on the Hollow Clay Tile Wall Program, 17:31370 (R;US)

BUILDINGS
See also RESIDENTIAL BUILDINGS
An integrated environment for intelligent energy design, 17:31117 (R;US)
Identification of building applications for a variable-conductance insulation, 17:31115 (R;US)
LVIS-2000 and ETRR Future building services and energy-efficient buildings and building components: Evaluation of the research programmes 1988-1990, 17:31107 (R;FI)
Remote supervision systems in communes, 17:31114 (R;FI;In Finnish)
Technical prevention of cold environments, 17:31116 (R;FI;In Finnish)
The influence of heat bridges on heat losses in buildings, 17:31104 (R;DK;In Danish)
The utilization of building maintenance feedback in Hepac-design, 17:31113 (R;FI;In Finnish)

BUNCHING (BEAM)
See BEAM BUNCHING

BUNDLES (FUEL ELEMENTS)
See FUEL ELEMENT CLUSTERS

BURNERS
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Quarterly technical progress report, October–December 1990, 17:30546 (R;US)
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Public design report, 17:30545 (R;US)
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Quarterly technical progress report, October–December 1990, 17:30546 (R;US)

BURNUP
Economic benefits of increased discharge burnup for PWR: Prospect of increasing discharge burnup for Daya Bay NPP and Qinshan NPP1, 17:30924 (R;CN)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32533 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32534 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32532 (CM;US)

BUSES
Natural gas and biogas vehicles: Projects and activities during 1991, 17:31190 (R;SE;In Swedish)

BUSHINGS
Engineering evaluation of the General Motors (GM) diesel rating and capabilities, 17:31040 (R;US)

BUSINESS
Increasing the end user's productivity through seamless integration of applications with the database, 17:32572 (R;US)

BWR TYPE REACTORS
See also GARONA REACTOR
HDR REACTOR
LA SALLE COUNTY-2 REACTOR
LINGEN REACTOR
RWE-BAYERNWERK REACTOR
Aging assessment of BWR standby liquid control systems, 17:30962 (R;US)
Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences, 17:31025 (R;US)
Analysis of PIUS reactor passive shutdown using PC-based model, 17:31003 (R;US)
Audit calculations with CORCON-MOD 3 of the duration of superheat in NUREG/CR-5423, 17:31031 (R;US)
Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)
Most likely failure location during severe accident conditions, 17:31009 (R;US)

Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991, 17:31022 (R;US)
Nondestructive examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Semiannual report, October 1990–March 1991: Volume 13, 17:30921 (R;US)
Proceedings of the fifth workshop on containment integrity, 17:31018 (R;US)
Spent fuel characteristics for TVO-92 safety analysis, 17:30879 (R;FI;In Finnish)
TRAC-BF1/MOD1 models and correlations, 17:31021 (R;US)
Workshop on the use of PRA methodology for the analysis of reactor events and operational data: Proceedings, 17:31019 (R;US)

C

C CODES
CURIE: Fission product inventory decay history, 17:32537 (CM;US)
C REACTOR
Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)
C-1430 RESONANCES
See MESONS
CABLES (ELECTRIC)
See ELECTRIC CABLES
CADMIUM
Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
CALCIUM
Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)
CALCIUM 48
A search for neutrinoless double beta decay of ^{48}Ca, 17:32241 (R;CN;In Chinese)
CALCIUM HYDROXIDES
Confined zone dispersion flue gas desulfurization demonstration: Volume 1, Quarterly report No. 4, August 1, 1991–October 31, 1991, 17:30484 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
CALCIUM OXIDES
Activation energy and critical current density in Bi-Sr-Ca-Cu-O, 17:31247 (R;US)
Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations, 17:31259 (R;US)
Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)
CALCULATIONS (COMPUTER)
See COMPUTER CALCULATIONS
CALIFORNIUM 252
Electrochemical etching of fission fragment tracks in dielectric detectors for use in chemical experiments with transplutonium elements, 17:31302 (R;SU;In Russian)
CALORIMETERS (PARTICLE)
See SHOWER COUNTERS
CANADA
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
CANCER
See NEOPLASMS
CANDU TYPE REACTORS
Nuclear safety. Beyond the technical details, 17:31032 (I;CA)
The role of nuclear power plant designers, 17:30907 (IA;CA)
The safety of Ontario's nuclear power reactor. A scientific and technical review. Report to the Minister, 17:30905 (I;CA;In English, French)
The safety of Ontario's nuclear power reactors. A scientific and technical review. Selected consultants' reports, 17:30909 (I;CA)
The safety of Ontario's nuclear power reactors. A scientific and technical review. Vol. 2: Appendices, 17:30908 (I;CA)
The safety of Ontario's nuclear power reactors. A scientific and tecnical review. Vol. 1: Report to the Minister, technical report and annexes, 17:30906 (I;CA)
CANISTERS
See CONTAINERS
CANONICAL QUANTUM FIELD THEORY
See LAGRANGIAN FIELD THEORY
CAPACITORS
Microwave sintering of multilayer ceramic capacitors, 17:31253 (R;US)
CAPSULES
Integrated near-field assessment, 17:30730 (RA;SE)
CARBINOL
See METHANOL
CARBON
See also FULLERENES
GRAPHITE
Determination of the permeability of carbon aerogels by gas flow measurements, 17:31280 (R;US)
Quasielastic scattering using the (p,n) reaction at 795 MeV, 17:32338 (R;US)
The nuclear reaction analysis (NRA) as a means for detecting carbon in GaAs and in source materials and additives. Final report, 17:31299 (I;DE;In German)
CARBON 11
Synthesis of tracers using automated radiochemistry and robotics: Progress report, April 1, 1992–July 31, 1992, 17:31331 (R;US)
CARBON 12 TARGET
Charge-exchange cross sections of the ^{3}H→^{3}He reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)
Evidence for alpha-particle chain configurations in ^{24}Mg, 17:32212 (R;US)
Orbiting: toward a unified model of nucleus-nucleus collision or excitation of nuclear molecular states in heavy ion collisions?, 17:32276 (R;US)
Polarized proton induced breakup of ^{12}C at 16 MeV, 17:32322 (R;JP)
To the problem of anomalous radiative proton capture in thick carbon targets, 17:32334 (R;SU;In Russian)
CARBON 13
An NMR study of the occupation of C_{60} interstitial sites by oxygen molecules, 17:32374 (R;US)
CARBON 14
Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth, 17:30761 (RA;US)
CARBON 14 EMISSION DECAY
Fine structures in ^{14}C emission of ^{223}Ra and ^{224}Ra, 17:32248 (R;FR)
CARBON CYCLE
Bacterially induced precipitation of $CaCO_3$: An example from studies of cyanobacterial mats: Final report, 17:31645 (R;US)
CARBON DIOXIDE
Formation and retention of methane in coal: Final report, 17:30470 (R;US)
Supercritical CO_2 cleaning for waste minimization, 17:31638 (R;US)
The MAGSORB process for bulk separation of carbon dioxide: Final report, 17:31296 (R;US)
The potential effects of concurrent increases in temperature, CO_2 and O_3 on net photosynthesis, as mediated by rubisCO, 17:31687 (R;US)
The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)
CARBON MONOXIDE
Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992, 17:31315 (R;US)
The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)

CARBON TETRACHLORIDE
Three-dimensional bioremediation modeling in heterogeneous porous media, 17:31728 (R;US)
CARBONATE ROCKS
See also LIMESTONE
Analysis of reservoir heterogeneities due to shallowing-upward cycles in carbonate rocks of the Pennsylvanian Wahoo Limestone of Northeastern Alaska: Annual report, October 1990–September 1991, 17:30560 (R;US)
CARCINOGENESIS
Comparative aspects of carcinogenic effects caused by protons, helium ions and γ-radiation, 17:31981 (RA;SU;In Russian)
CARCINOGENS
Energy and Technology Review, April–May 1992, 17:31768 (R;US)
CARCINOMAS
A flexible computer model for radon daughter exposure health risk assessment, 17:31938 (IA;CA)
Issues in risk assessment and modifications of the NRC health effects models, 17:31998 (R;US)
Labeling, control and radiopharmaceutical evaluation of ^{99m}Tc-ADP as tumor seeking agent, 17:31818 (RA;US)
Lung cancer induction in rats by radon daughter exposure: Status as of 1984 on low doses effects, 17:31931 (IA;CA)
Technetium labelled somatostatin a potential agent for in vivo tumor localization, 17:31791 (RA;US)
CASCADE (EXTRACTION)
See EXTRACTION COLUMNS
CASPIAN SEA
Active tectonics of the south Caspian basin and surrounding regions, 17:32017 (RA;US)
CASTING
Experimentation and simulation of gravity fed lead castings, 17:31236 (R;US)
CATALYSTS
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991, 17:30448 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991, 17:30447 (R;US)
CATAPHORESIS
See ELECTROPHORESIS
CATHODE RAY TUBES
Shielded helix traveling wave cathode ray tube deflection structure, 17:31415 (PA;US)
CATHODES
Impact of protective oxides on cathode-side resistances in MCFCs, 17:31085 (R;US)
CATTLE
Serological studies on bovine leukemia virus (BLV) infection in Costa Rica by ELISA, immunodiffusion and Western blot tests, 17:31863 (RA;XA)
The use of ELISA and nucleic acid hybridization tests in research and diagnosis of bovine leukosis virus, 17:31862 (RA;XA)
CAUCHY PROBLEM
Topological properties of the solution sets to differential inclusions of evolution type, 17:32083 (R;XA)
CAVITY RESONATORS
Nonlinear stability of combustion-driven acoustic oscillations in resonance tubes, 17:32062 (R;US)
CCD
See CHARGE-COUPLED DEVICES
CEBAF ACCELERATOR
A short-orbit spectrometer for Hall C, 17:31471 (R;US)
CELL GROWTH (ANIMAL)
See ANIMAL CELLS
CELL MEMBRANES
Cellular and molecular pathways of extremely-low-frequency electromagnetic field interactions with living systems, 17:32006 (R;US)
CELL NUCLEI
Development and validation of a simple model for cellular and cell cluster dosimetry with practical application in targeted radionuclide therapy, 17:31907 (RA;US)
CELLOBIOSE
Simultaneous saccharification and fermentation (SSF) using cellobiose fermenting yeast Brettanomyces custersii (CBS 5512), 17:30807 (PA;US)
CELLS (ANIMAL)
See ANIMAL CELLS
CELLS (ELECTROLYTIC)
See ELECTROLYTIC CELLS
CELLULOSE
The fermentation of lignocellulose hydrolysates with xylose isomerases and yeasts, 17:30802 (R;SE)
CEMENTS
Acoustic monitoring techniques for corrosion degradation in cemented waste canisters, 17:30691 (R;FR)
CERAMIC MELTERS
A process control sensor for the glass industry: Phase 1, Extended development program, 17:31256 (R;US)
CERAMICS
A method of noncontacting ultrasonic process monitoring, 17:31262 (PA;US)
Investigation of properties and performance of ceramic composite components, 17:31260 (R;US)
Microwave sintering of multilayer ceramic capacitors, 17:31253 (R;US)
[High temperature fatigue crack growth in ceramics and ceramic composites]: [Annual report, August 1991–July 1992], 17:31255 (R;US)
CEREALS
See also RICE
The research progress on plant mutant germplasm resources in China, 17:31859 (R;CN;In Chinese)
CEREBRAL CORTEX
Functional MRI studies of human vision on a clinical imager, 17:31849 (R;US)
CERN AG SYNCHROTRON
See CERN PS SYNCHROTRON
CERN II SYNCHROTRON
See CERN SPS SYNCHROTRON
CERN PS SYNCHROTRON
Experience with the BEAMSCOPE emittance measurement system at the CERN PS Booster, 17:31495 (RA;JP)
CERN SPS SYNCHROTRON
Beam position monitor using a reentrant coaxial cavity, 17:31496 (RA;JP)
CERULOPLASMIN
The disbalance of microelements in the blood of irradiated animals and its normalization with ceruloplasmin, 17:31983 (R;UA;In Russian)
The role of ceruloplasmin in rise of resistance modes of organism to different radiation, 17:31985 (RA;UA;In Russian)
CESIUM
Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)
Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes, 17:30699 (R;FR;In French)
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
CESIUM 134
Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)
CESIUM 135
Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor, 17:30685 (R;NL)
CESIUM 137
Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)

Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector, 17:31748 (R;US)
Radioecology in Nordic limnic systems - present knowledge and future prospects, 17:31757 (R;SE)

CESIUM IODIDES
Cesium iodide alloys, 17:31613 (PA;US)
The kinetic behaviour of iodine and cesium under severe accident conditions, 17:31342 (RA;JP)
The oxidation of cesium iodine aerosols during hydrogen combustion, 17:31340 (RA;JP)

CFC
See CHLOROFLUOROCARBONS

CFFF
See MHD GENERATOR CFFF

CHALKS
See LIMESTONE

CHARGE-COUPLED DEVICES
Development of a programmable CCD detector for imaging, real time studies and other synchrotron radiation applications, 17:31551 (R;FR;In French)
Systems for study on spatial beam characteristics based on CCD, 17:31459 (R;SU;In Russian)

CHARGED-PARTICLE TRANSPORT
The Beasts' model of percolative transport, 17:32424 (R;FR)

CHARM PARTICLES
See also CHARMED BARYONS
Charm particle physics. A Tool-box for QCD, 17:32173 (R;FR;In French)
Systematics of charm hadroproduction, 17:32159 (IA;DE)

CHARMED BARYON RESONANCES
See CHARMED BARYONS

CHARMED BARYONS
Experimental study of charmed baryons at SuperLEAR, 17:32176 (R;FR)

CHARMONIUM
See also J PSI-3097 MESONS
Quantum effects and colour transparency in charmonium photoproduction on nuclei, 17:32324 (R;SU)

CHARS
Characterization of porosity via secondary reactions: Quarterly technical progress report, 15 December 1991–15 March 1992, 17:30473 (R;US)
Cooperative research on the combustion characteristics of cofired desulfurized Illinois coal and char with natural gas: Technical report, December 1, 1991–February 29, 1992, 17:30551 (R;US)
Oil shale ash-layer thickness and char combustion kinetics, 17:30602 (R;US)

CHARTS
See DIAGRAMS

CHEMICAL ANALYSIS
See also MULTI-ELEMENT ANALYSIS
NONDESTRUCTIVE ANALYSIS
Innovative methods for inorganic sample preparation, 17:31286 (R;US)

CHEMICAL EFFLUENTS
Miscellaneous Waste Stream strategy document, 17:30703 (R;US)

CHEMICAL EXPLOSIVES
See also PETN
A quantitative method to detect explosives and other selected semivolatiles in soil samples by Fourier transform infrared spectroscopy, 17:31686 (R;US)
Destruction of explosives and rocket fuels by supercritical water oxidation, 17:31630 (R;US)
Detonation reactions frozen by free expansion and analyzed by mass spectrometry, 17:31631 (R;US)
Nonideal thermoequilibrium calculations using a large product species data base, 17:31635 (R;US)

CHEMICAL REACTORS
Comprehensive model development and evaluation, 17:30433 (RA;US)
[New process modeling, design and control strategies for energy efficiency, high product quality and improved productivity in the process industries], 17:31313 (R;US)

CHEMICAL WARFARE AGENTS
Protocol for determination of chemical warfare agent simulant movement through porous media, 17:31642 (R;US)
The IAEA system and experience as a model for Information Management under the Chemical Weapons Convention, 17:31196 (R;US)

CHEMICAL WASTES
See also CHEMICAL EFFLUENTS
Aqueous phase oxidation techniques as an alternative to incineration, 17:31322 (R;US)
Radar operations process waste assessment: Solder pot tinning, 17:31132 (R;US)

CHEMISTRY
See also ATMOSPHERIC CHEMISTRY
BIOCHEMISTRY
GEOCHEMISTRY
PHOTOCHEMISTRY
RADIATION CHEMISTRY
RADIOCHEMISTRY
A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)

CHERENKOV COUNTERS
Effects of the point-like nucleus model on the EGS simulation results, 17:31581 (RA;JP;In Japanese)

CHERENKOV DETECTORS
See CHERENKOV COUNTERS

CHERNOBYLSK-4 REACTOR
Environmental and agricultural impacts of the Chernobyl NPP accident on the countries of the northern hemisphere, 17:31867 (R;CN;In Chinese)

CHI RESONANCES
See MESONS

CHI-2800 RESONANCES
See MESONS

CHI-3455 RESONANCES
See MESONS

CHILDREN
Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)

CHINA
Characterization of selected countries, 17:30555 (RA;US)
Radiological environmental quality assessment of the nuclear industry in China over the past 30 years, 17:30964 (R;CN;In Chinese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1, 17:31054 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view, 17:31053 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1, 17:31054 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view, 17:31053 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 2, 17:31055 (R;JP;In Japanese)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

CHINA CLAY
See KAOLIN

CHLORIDES
See also SODIUM CHLORIDES
Acid copper sulfate plating bath: Control of chloride and copper: Final report, 17:31320 (R;US)

CHLORINATED ALIPHATIC HYDROCARBONS
See also CARBON TETRACHLORIDE
CHLOROFORM

Pilot process waste assessment for the fireset area, 17:31621 (R;US)
CHLORINATED AROMATIC HYDROCARBONS
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)
CHLORINE IONS
Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)
CHLOROFLUOROCARBONS
Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)
Laboratory measurement of miscibility and pressure/temperature relationships of n-C_4F_{10}/CFC-114 mixtures, 17:31319 (R;US)
New technologies for refrigeration without CFCs, 17:31133 (R;US)
The role of refrigerants in climate change, 17:31679 (R;US)
CHLOROFORM
Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)
CHROMATID DELETIONS
See CHROMOSOMAL ABERRATIONS
CHROMATOGRAPHIC COLUMNS
See EXTRACTION COLUMNS
CHROMATOGRAPHY
See also LIQUID COLUMN CHROMATOGRAPHY
The compactness of front tracking for chromatography electrophoresis and incompressible multiphase flow, 17:32365 (R;US)
CHROMIUM 52
International evaluation cooperation task 1.1 : intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32284 (R;NL)
CHROMIUM 52 TARGET
The EFF-2 evaluation for the reaction systems n + ^{52}Cr, ^{56}Fe, ^{58}Ni and ^{60}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32282 (R;NL)
CHROMIUM ALLOYS
See also CHROMIUM STEELS
Weak-beam imaging of dissociated dislocations in HVEM-irradiated Fe-Ni-Cr alloys, 17:31200 (R;US)
CHROMIUM COMPLEXES
Investigation on the gas-phase radiolysis of metal complexes, 17:31328 (R;JP;In Japanese)
CHROMIUM IODIDES
Infrared spectra of the gaseous iodides of chromium, iron and nickel, 17:31227 (R;NL)
CHROMIUM STEELS
ASTM international symposium on small specimen test techniques and their applications to pressure vessel annealing and plant life extension, 17:30948 (R;US)
The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria, 17:31210 (R;FR;In French)
CHROMODYNAMICS
See QUANTUM CHROMODYNAMICS
CHROMOSOMAL ABERRATIONS
AET and MEA affect on chromosomal aberrations occurrence in root meristems under γ-irradiation of plants within wide dose range from stimulatory up to superlethal doses, 17:31980 (RA;SU;In Russian)
Comparative study of qualitative cytogenetic effects induced by fractionated γ-neutron irradiation in man lymphocytes at G_0 and G_1 stages, 17:31970 (RA;SU;In Russian)
Modifying influence of DNA synthesis inhibitors on the effect of irradiation of Chinese hamster cells, 17:31968 (RA;SU)
To the problem of DNA-target for radiation-induced exchange chromosomal aberrations, 17:31974 (RA;SU;In Russian)
CHROMOSOME ABERRATIONS
See CHROMOSOMAL ABERRATIONS
CHROMOSOME EXCHANGES
See CHROMOSOMAL ABERRATIONS
CHROMOSOME FRAGMENTS
See CHROMOSOMAL ABERRATIONS
CIRCUITS (ELECTRONIC)
See ELECTRONIC CIRCUITS
CITIES
See URBAN AREAS
CLASSICAL MECHANICS
DOE Fundamentals Handbook: Classical Physics, 17:30926 (R;US)
Non-commutative differential geometry: 1. Geometrical symplectic formulation of classical mechanics, 17:32023 (R;XA)
CLAYS
See also BENTONITE
KAOLIN
Test procedure for prism compression testing, 17:31369 (R;US)
The HADES demonstration and pilot project on radioactive waste disposal in a clay formation, 17:30687 (R;FR)
CLIMATIC CHANGE
See also GREENHOUSE EFFECT
Studies of the role of clouds in CO_2-induced climate change: Progress report, September 15, 1991–September 14, 1992, 17:31646 (R;US)
CLIPPING CIRCUITS
See PULSE SHAPERS
CLOSED-LOOP CONTROL
Excitation adjustable system of toroidal field waveform for tokamak HL-1, 17:32397 (R;CN;In Chinese)
CLOUDS
Studies of the role of clouds in CO_2-induced climate change: Progress report, September 15, 1991–September 14, 1992, 17:31646 (R;US)
CLUFF LAKE MINE
Radiation protection at a high grade uranium mine, 17:30613 (IA;CA)
CLUSTER BEAMS
Jet targets on electron rings the Argon cluster-beam in ADONE, 17:31530 (RA;FR)
Penetration of Hydrogen clusters from 10 to 120 kev/u in carbon foils. Study of their slowing-down and charge distribution of emerging fragments, 17:32341 (R;FR;In French)
CLUSTERS (FUEL ELEMENTS)
See FUEL ELEMENT CLUSTERS
CLUSTERS (STAR)
See STAR CLUSTERS
CO-GENERATION
See COGENERATION
COAL
See also COAL FINES
SUBBITUMINOUS COAL
Adsorption Heat
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
Cocombustion
Cooperative research on the combustion characteristics of cofired desulfurized Illinois coal and char with natural gas: Technical report, December 1, 1991–February 29, 1992, 17:30551 (R;US)
Combustion
Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992, 17:30552 (R;US)
Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988, 17:30544 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: First quarterly report, February 1987, 17:30548 (R;US)

Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport: Quarterly technical progress report, March 15, 1992–June 14, 1992, 17:30550 (R;US)
Combustion Kinetics
Final report of ICCP-activity, stage 5, 17:30474 (R;SE;In Swedish, English)
Structure of a near-laminar coal jet flame, 17:30542 (RA;US)
Submodel development and evaluation, 17:30432 (RA;US)
Desulfurization
Applications of micellar enzymology to clean coal technology: Tenth quarterly report, 17:30438 (R;US)
Drying
The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
Fluidized-Bed Combustion
A dimensional model for char combustion in a circulating fluidized bed, 17:30539 (R;FI)
Reaction kinetics of coal combustion: A literature review, 17:30538 (R;FI)
Interactions
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
Plasticity
Coal plasticity at high heating rates and temperatures: First technical progress report for the fourth quarter 1989, 17:30439 (R;US)
Porosity
Characterization of porosity via secondary reactions: Quarterly technical progress report, 15 December 1991–15 March 1992, 17:30473 (R;US)
Pyrolysis
Cleavage and crosslinking of polymeric coal structures during pyrolysis: Final report, 17:30435 (R;US)
Quantitative Chemical Analysis
Concentration of light homologs of superheavy elements in coal combustion, 17:31724 (R;SU;In Russian)
Staged Combustion
Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988, 17:30544 (R;US)
Structural Chemical Analysis
^{31}P NMR analysis of coal moieties bearing -OH, -NH, and -SH functions: Final technical report, 17:30469 (R;US)
Supply and Demand
Short-term energy outlook: Quarterly projections, Third quarter 1992, 17:31066 (R;US)
Swelling
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
Viscosity
Coal plasticity at high heating rates and temperatures: Second technical progress report for the third quarter 1990, 17:30440 (R;US)
Water Removal
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
Wetting Heat
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
COAL FINES
Carbonation as a binding mechanism for coal/calcium hydroxide pellets: Technical report, December 1, 1991–February 29, 1992, 17:30426 (R;US)
Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992, 17:30552 (R;US)
Research and development for storage, transport, and handling of coal-based fuels: Final report, 17:30537 (R;US)
COAL GAS
Desulfurization of hot fuel gas produced from high-chlorine Illinois coals: Technical report, December 1, 1991–February 29, 1992, 17:30459 (R;US)
COAL GASIFICATION
Application of integrated codes, 17:30434 (RA;US)
Mild coal gasification: Product separation, 17:30460 (R;US)
Submodel development and evaluation, 17:30432 (RA;US)
COAL LIQUEFACTION
See also LIQUID PHASE METHANOL PROCESS
Direct coal liquefaction baseline design and system analysis: Quarterly report, May–August 1990, 17:30446 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, September–December 1990, 17:30445 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, October–December 1991, 17:30442 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, January–March 1991, 17:30444 (R;US)
Direct coal liquefaction baseline design and system analysis: Quarterly report, April–June 1991, 17:30443 (R;US)
Enhancing low severity coal liquefaction reactivity using mild chemical pretreatment: Quarterly technical progress report, December 1991–February 1992, 17:30455 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991, 17:30448 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991, 17:30447 (R;US)
Mitigating crosslinking reactions through preconversion strategies: Quarterly progress report, 17:30457 (R;US)
Temperature-programmed liquefaction of low-rank coals in H-donor and non-donor solvents, 17:30431 (R;US)
The effect of selective absorption on coal conversion, October–December 1991, 17:30456 (R;US)
[Direct coal liquefaction baseline design and system analysis]: Quarterly status report, [December 23, 1991–March 15, 1992], 17:30441 (R;US)
COAL MINES
Energy and environment: transitions in Eastern Europe: Book of abstracts, 17:30485 (I;CS)
Monitoring of radiation exposure from different natural sources in Polish coal mines, 17:31722 (IA;CA)
COAL PREPARATION
Cyclic voltammetric study, 17:30422 (RA;US)
ESCA studies of particulate pyrite, 17:30471 (RA;US)
Electrochemical and flotation experiments involving particulate mineral and coal pyrite, 17:30424 (RA;US)
Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)
Technology descriptions and demonstrations, 17:30419 (RA;US)
The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
COAL SEAMS
Formation and retention of methane in coal: Final report, 17:30470 (R;US)
Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)
COAL TAR
Cleavage and crosslinking of polymeric coal structures during pyrolysis: Final report, 17:30435 (R;US)
COAL-OIL MIXTURES
See COAL
FUEL SLURRIES
COASTAL WATERS
Coastal resuspension, 17:31684 (R;GB)

Wind energy calculations for Swedish coastal water conditions. Report nr 3, 17:30855 (R;SE;In Swedish)

COATED FUEL PARTICLES
An examination on the determination precision of uranium content in the HTGR fuel compacts, 17:30991 (R;JP;In Japanese)
Evaluation of MHTGR fuel reliability, 17:30904 (R;US)

COATINGS
Solid oxide fuel cell processing using plasma arc spray deposition techniques: Final report, 17:31083 (R;US)

COBALT
Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)

COBALT 57
Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)

COBALT ALLOYS
Summary of the 12th study meeting of hydrogen energy system, 17:30794 (I;JP;In Japanese)

COBALT COMPLEXES
Investigation on the gas-phase radiolysis of metal complexes, 17:31328 (R;JP;In Japanese)

COGENERATION
Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems, 17:31059 (R;US)

COILS (ELECTRIC)
See ELECTRIC COILS

COILS (MAGNETIC)
See MAGNET COILS

COKE-OVEN GAS
See COAL GAS

COLD FUSION
Measurements of excess heat from a Pons-Fleischmann type electrolytic cell using palladium sheet, 17:32432 (R;US)

COLD NEUTRONS
Calculation of a variant of the 'inelastic' adiabatic spin-flipper for cold neutrons, 17:32346 (R;SU;In Russian)

COLD TRAPS
Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)

COLLECTOR PROPERTIES
See POROSITY

COLLECTOR PROPERTIES (ROCKS)
See POROSITY

COLLIDING BEAMS
Low frequency transverse resistive instability in the collider, 17:31467 (R;US)
The partial beam lifetime at RHIC due to Coulomb dissociation of the nucleus, 17:31448 (R;US)

COLLIERIES
See COAL MINES

COLLIMATORS
SPECT assay of radiolabeled monoclonal antibodies: Comprehensive progress report, September 1989–February 1992, 17:31778 (R;US)

COLLOIDS
See also FOAMS
GELS
Colloids in groundwater: Their mobilization, subsurface transport, and sorption affinity for toxic chemicals: Annual technical progress report, 17:31751 (R;US)

COLOGNE SPIRITS
See ETHANOL

COLON
See LARGE INTESTINE

COLORADO
Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)
Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)

COLUMBIA RIVER
Analytical services - Pile area laboratories, 17:30984 (R;US)

COLUMNS (EXTRACTION)
See EXTRACTION COLUMNS

COMBINED GAS AND STEAM CYCLE POWER PLANTS
See COMBINED-CYCLE POWER PLANTS

COMBINED STEAM-POWER GENERATION
See COGENERATION

COMBINED-CYCLE POWER PLANTS
Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)
Technology descriptions and demonstrations, 17:30419 (RA;US)

COMBUSTION
See also FLUIDIZED-BED COMBUSTION
SPONTANEOUS COMBUSTION
STAGED COMBUSTION
A simulation model for time-dependent drying, devolatilization and combustion of a single solid fuel particle, 17:31376 (R;FI)
Studies in nonlinear problems of energy: Progress report, January 1, 1992–December 31, 1992, 17:31345 (R;US)

COMBUSTION KINETICS
A preliminary study of the effect of equivalence ratio on a low emissions gas turbine combustor using KIVA-II, 17:30866 (R;US)

COMBUSTORS
See also CYCLONE COMBUSTORS
FLUIDIZED-BED COMBUSTORS
A preliminary study of the effect of equivalence ratio on a low emissions gas turbine combustor using KIVA-II, 17:30866 (R;US)
Application of integrated codes, 17:30434 (RA;US)
Comprehensive model development and evaluation, 17:30433 (RA;US)
Structural analysis of thermal fatigue failures on rocket combustion chambers by the finite element method, 17:31407 (R;JP)
Technology descriptions and demonstrations, 17:30419 (RA;US)

COMMERCE (NUCLEAR)
See NUCLEAR TRADE

COMMINUTION
A simple method for separating fines from fuel chips, 17:30805 (R;SE;In Swedish)

COMMUNICATIONS
JINR rapid communications: Collection, 17:31570 (R;SU)

COMMUNITIES (ECOLOGICAL)
See ECOSYSTEMS

COMMUTATORS
Maximal reductions in the Baker-Hausdorff formula, 17:32044 (R;NO)

COMPLEXES
See also HETEROPOLYANIONS
HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

COMPOSITE MATERIALS
Ductile fracture process of discontinuous fiber reinforced composites, 17:31272 (R;US)
Fabrication of high temperature materials by exothermic synthesis and subsequent dynamic consolidation, 17:31276 (PA;US)
Global-local finite element analysis of composite structures, 17:31277 (R;US)
Investigation of properties and performance of ceramic composite components, 17:31260 (R;US)
[High temperature fatigue crack growth in ceramics and ceramic composites]: [Annual report, August 1991–July 1992], 17:31255 (R;US)

COMPOUND NUCLEI
Mechanism of enhanced yield of light particles in compound nucleus formation: diffusion description, 17:32328 (R;SU)

COMPOUNDS (ORGANIC)
See ORGANIC COMPOUNDS

COMPUTED TOMOGRAPHY
See COMPUTERIZED TOMOGRAPHY

COMPUTER ARCHITECTURE
Computer assisted audit techniques for UNIX (UNIX-CAATS), 17:32509 (R;US)
DATA: How to generate, store, retrieve, communicate, and interpret it: Proceedings, 17:32510 (R;US)
LFK: Livermore FORTRAN kernel computer test, 17:32527 (CM;US)

- Savannah River Site computing standards and guidelines reference, 17:32569 (R;US)

COMPUTER CALCULATIONS
- Calculations of bremsstrahlung photon spectrum from β-ray radioisotopes, 17:31580 (RA;JP;In Japanese)
- Improvement in the EGS4 code system - general purpose electron-photon Monte Carlo transport code system, 17:31583 (RA;JP;In Japanese)
- Running EGS4 on Unix workstations and personal computers, 17:31582 (RA;JP;In Japanese)

COMPUTER CODES
- *See also* A CODES
  - B CODES
  - C CODES
  - D CODES
  - E CODES
  - F CODES
  - G CODES
  - I CODES
  - L CODES
  - M CODES
  - NUMBER CODES
  - P CODES
  - S CODES
  - T CODES
  - U CODES
  - V CODES
- Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
- "You need this done by when?": Increasing your efficiency with the SAS® system, 17:32518 (R;US)

COMPUTER LANGUAGES
- *See* PROGRAMMING LANGUAGES

COMPUTER NETWORKS
- Analysis and evaluation of information network system, 17:32573 (IA;JP;In Japanese)
- DATA: How to generate, store, retrieve, communicate, and interpret it: Proceedings, 17:32510 (R;US)
- GNETS: Graphical Network Security system user guide, 17:32555 (R;US)
- HIPPI and Fibre Channel, 17:32557 (R;US)
- Mechanical behaviour of a closed collar model for an 11.5 T dipole magnet, 17:31519 (R;NL)
- Reviews of computing technology: Fiber distributed data interface: Revision, 17:32568 (R;US)
- TCP performance analysis for wide area networks, 17:32564 (R;US)

COMPUTER PROGRAMS
- *See* COMPUTER CODES

COMPUTERIZED CONTROL SYSTEMS
- An integrated optical sensor for GMAW feedback control, 17:31358 (R;US)
- Driving a car with custom-designed fuzzy inferencing VLSI chips and boards, 17:32511 (R;US)
- Installation and evaluation of a nuclear power plant operator advisor based on artificial intelligence technology: Interim progress report and second year development plan, 17:30957 (R;US)
- Quantitative methods for developing C2 system requirement, 17:31624 (R;US)

COMPUTERIZED SIMULATION
- Construction of large-scale simulation codes using ALPAL: Generation of a hydrodynamics code module, 17:32565 (R;US)
- The HADES demonstration and pilot project on radioactive waste disposal in a clay formation, 17:30687 (R;FR)

COMPUTERIZED TOMOGRAPHY
- Contrast-enhanced computed tomography of the primary tumor in muscle invasive carcinoma of the urinary bladder, 17:31851 (I;NO)
- Use of a model for 3D image reconstruction, 17:31770 (R;FR;In French)

COMPUTERS
- *See also* HYPERCUBE COMPUTERS
- Establishing and operating an incident response team, 17:30769 (R;US)
- Guide to computer protection at ANL: Revision 1, 17:32505 (R;US)
- Safeguards technology and computer security training, 17:30770 (R;US)

CONCRETES
- Deformation stresses and mechanical behaviour of engineered barriers in the repository environment, 17:30750 (R;FI;In Finnish)
- Measurement of the removal sechtion of biological protection concretes in the spectrum of an AmBe source, 17:32343 (I;CU;In Spanish)

CONDENSERS (ELECTRIC)
- *See* CAPACITORS

CONDUCTIVITY (THERMAL)
- *See* THERMAL CONDUCTIVITY

CONDUCTORS (ELECTRIC)
- *See* ELECTRIC CONDUCTORS

CONFORMAL GROUPS
- Continuous realizations of extended conformal algebras, 17:32120 (R;FR)
- Operator algebra from fusion rules II: Implementing apparent singularities, 17:32124 (R;NL)

CONNECTORS
- Alternative materials for solid oxide fuel cells: Factors affecting air-sintering of chromite interconnections, 17:31088 (R;US)

CONSERVATION (ENERGY)
- *See* ENERGY CONSERVATION

CONTAINERS
- *See also* CAPSULES
  - PRESSURE VESSELS
  - REACTOR VESSELS
  - TANKS
- Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
- Uranium hexafluoride (UF$_6$) and 21 PF-1 overpack: Proposed rulemaking revisions, 17:30644 (R;US)

CONTAINMENT
- *See also* CONTAINMENT SHELLS
- The dynamic response of the containment of the Qinshan nuclear power plant to the aircraft impact loading, 17:30888 (R;CN;In Chinese)

CONTAINMENT SHELLS
- Overview of the ACF iodine project, 17:31013 (RA;JP)

CONTAMINATION
- Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)

CONTENT ANALYSIS
- *See* CHEMICAL ANALYSIS

CONTINENTAL SHELF
- The flux and recycling of bioactive substances in the surface sediments of the deep basins off southern California: Final report, 17:31695 (R;US)

CONTRACTORS
- The challenge of performance-based MC&A training for R&D facilities, 17:32484 (R;US)

CONTROL (INSPECTION)
- *See* INSPECTION

CONTROL (RADIOACTIVITY)
- *See* RADIATION MONITORING

CONTROL ELEMENTS
- *See also* SCRAM RODS
- Cadmium safety rod thermal tests, 17:30963 (R;US)
- Countercurrent flow-limiting characteristics of a Savannah River Plant control rod septifoil, 17:31011 (R;US)
- Heat flux limits for control and safety rods, 17:31006 (R;US)
- Machining technology for spider of control assembly, 17:30954 (R;CN;In Chinese)
- The steam explosion potential for an unseated SRS reactor septifoil, 17:31037 (R;US)
- Thermal hydraulic performance of naturally aspirated control rod housing assemblies, 17:31034 (R;US)

CONTROL ROD DRIVES
Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)
CONTROL RODS
See CONTROL ELEMENTS
CONTROL ROOMS
Advanced control room design review guidelines: Merging old and new, 17:30956 (R;US)
CONVECTION
See also NATURAL CONVECTION
Statistical distribution of temperatures and physical properties of geothermal areas in Japan, based on logging and core data of boreholes, 17:30839 (IA;JP;In Japanese)
CONVERTERS (ANALOG-DIGITAL)
See ANALOG-TO-DIGITAL CONVERTERS
COOLANT-FUEL INTERACTIONS
See FUEL-COOLANT INTERACTIONS
COOLERS
See HEAT EXCHANGERS
COOLING SYSTEM (REACTOR)
See REACTOR COOLING SYSTEMS
COOLING SYSTEMS
See also REACTOR COOLING SYSTEMS
Heating and cooling with low-temperature water: Prerequisities, experiences, possibilities, 17:31145 (R;SE;In Swedish)
New technologies for refrigeration without CFCs, 17:31133 (R;US)
SAS Froesundavik. An office heated and cooled by groundwater, 17:31092 (R;SE)
COPPER
Acid copper sulfate plating bath: Control of chloride and copper: Final report, 17:31320 (R;US)
Wastage-resistant FBC evaporator tubing through microalloying, 17:31223 (R;US)
COPPER 64 TARGET
Charge-exchange cross sections of the $^3H \rightarrow ^3He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)
COPPER ALLOYS
See also COPPER BASE ALLOYS
A study of the vacancy loop formation probability in Ni-Cu and Ag-Pd alloys, 17:31202 (R;US)
COPPER BASE ALLOYS
The response of dispersion-strengthened copper alloys to high fluence neutron irradiation at 415°C, 17:32467 (R;US)
COPPER IONS
Acid copper sulfate plating bath: Control of chloride and copper: Final report, 17:31320 (R;US)
COPPER ORES
Multielemental gamma activation analysis of copper-molybdenum ores and its production of processing using microtron, 17:31301 (R;SU;In Russian)
COPPER OXIDES
Activation energy and critical current density in Bi-Sr-Ca-Cu-O, 17:31247 (R;US)
Flux pinning in oxygen-depleted $YBa_2Cu_3O_{7-y}$ single crystals, 17:31264 (R;US)
High-temperature deformation and diffusion in oxides, 17:31245 (R;US)
Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations, 17:31259 (R;US)
Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)
CORES (DRILL)
See DRILL CORES
CORES (REACTOR)
See REACTOR CORES
CORIUM
Audit calculations with CORCON-MOD 3 of the duration of superheat in NUREG/CR-5423, 17:31031 (R;US)
Gas blowthrough and flow quality correlations for use in the analysis of high pressure melt ejection (HPME) events, 17:31030 (R;US)
CORRELATION ENERGY
See ELECTRON CORRELATION
CORROSION
Corrosion problems of materials for mechanical, power and chemical engineering: National conference, 17:31230 (I;CS;In Czech, Slovak)
CORTEX (CEREBRAL)
See CEREBRAL CORTEX
COSMIC DUST
Manifestations of electric currents in interstellar molecular clouds, 17:32063 (R;SE)
COSMIC PARTICLES
See COSMIC RADIATION
COSMIC RADIATION
Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)
COSMOGONY
See COSMOLOGY
COSMOLOGICAL MODELS
See also INFLATIONARY UNIVERSE
Fourth-rank gravity and cosmology, 17:32077 (R;XA)
COSMOLOGY
General relativistic model of a spinning cosmic string, 17:32126 (R;NO)
Gravitational effect of the quantum vacuum outside a cosmic string, 17:32127 (R;NO)
COSMOS
See UNIVERSE
COST
Integrated risk management for business survival, 17:32497 (R;US)
COST BENEFIT ANALYSIS
Life cycle cost analysis of solar heating and DHW systems in residential buildings, 17:30820 (R;FR)
COUNTERS (RADIATION)
See RADIATION DETECTORS
CRACKS
Final report on Test 4 - Sealing of natural fine-fracture zone, 17:31738 (R;SE)
CRANES
An elevator for cobalt-60 source, 17:30784 (R;CN;In Chinese)
CROPS
Soils newsletter. V. 15, no. 1, 17:31866 (I;XA)
CROSS SECTIONS
Deuteron photodisintegration by linearly polarized photons in the energy region 0.3-1.0 GeV, 17:32310 (RA;FR)
CROSSED BEAMS
See COLLIDING BEAMS
CRUCIBLES
Heat transfer in a liquid metal crucible with an integral black-body cavity, 17:31402 (R;US)
CRUDE OIL
See PETROLEUM
CRYSTAL COUNTERS
High resolution crystal calorimetry at LHC, 17:31584 (R;FR)
CRYSTAL DEFECTS
High-temperature deformation and diffusion in oxides, 17:31245 (R;US)
CRYSTAL GROWTH
Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991, 17:31270 (R;US)
CRYSTAL STRUCTURE
See also CRYSTAL DEFECTS
12th general conference of the condensed matter division of the E.P.S. V.16A., 17:32372 (I;CS)
Neutron diffraction study of $Sr_xBa_{1-x}Nb_2O_6$ crystals, 17:32373 (IA;CS)
CRYSTALLINE ROCKS
See METAMORPHIC ROCKS
CRYSTALLOGRAPHY
Background modelling in Rietveld analysis, 17:31288 (R;US)
CRYSTALS
See also MONOCRYSTALS

Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991, 17:32479 (R;US)
Thermal effects on the frequency response of piezoelectric crystals, 17:31265 (R;US)

CUMULATIVE EFFECT
See PARTICLE PRODUCTION

CUPRATES
Oxygen diffusion in high-T_c superconductors, 17:31246 (R;US)

CURVES
See DIAGRAMS

CYANATES
Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report, 17:31131 (R;US)

CYANOBACTERIA
Bacterially induced precipitation of $CaCO_3$: An example from studies of cyanobacterial mats: Final report, 17:31645 (R;US)

CYCLOALKANES
See also CYCLOHEXANE
Structure sensitive reactions over Co, Fe and mixed metal clusters in zeolites: Annual technical progress report, 17:31314 (R;US)

CYCLOHEXANE
Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991, 17:30437 (R;US)

CYCLONE COMBUSTORS
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Quarterly technical progress report, October–December 1990, 17:30546 (R;US)
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Public design report, 17:30545 (R;US)
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Quarterly technical progress report, June–September 1990, 17:30547 (R;US)

CYCLOTRONS
See also ISOCHRONOUS CYCLOTRONS
AGOR: A superconducting cyclotron for light and heavy ions plans for experimental facilities and physics program, 17:31433 (R;FR)

CYTOCHROMES
Applying ion-molecule reactions to studies of gas-phase protein structure, 17:31762 (R;US)

D

D CODES
DACRIN: Radiation organ dose from inhalation, 17:32536 (CM;US)
DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)
DISPERS: Mathematical models for dispersion of radionuclides, 17:32547 (CM;US)

D MESONS
Parameters of low-energy physics, radial excitations of π, K, D mesons and QCD potential, 17:32144 (R;SU)

D PLUS RESONANCES
See D MESONS

D* PLUS RESONANCES
See BARYONS

D* ZERO RESONANCES
See BARYONS

D*RESONANCES
See BARYONS

D-1865 RESONANCES
See D MESONS

D-D REACTORS
Fast ion-driven Bernstein instabilities, 17:32418 (R;US)

D-T REACTORS
Fast ion-driven Bernstein instabilities, 17:32418 (R;US)

DAIRY INDUSTRY
Heat insulated tube system for dairying environment, 17:31135 (R;SE)

DARK REPAIR
See BIOLOGICAL REPAIR

DATA ACQUISITION SYSTEMS
Data acquisition and processing system for coincidence measurements, 17:31545 (R;CN;In Chinese)
Fully pipelined and programmable Level 1 trigger, 17:31527 (R;US)
Hardware for research of transition processes in condensed matter with neutron diffraction method, 17:31616 (R;SU;In Russian)

DATA ANALYSIS
Analysis and evaluation of data from the nationwide survey of geothermal exploration, 17:30841 (I;JP;In Japanese)
Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)

DATA BASE MANAGEMENT
DATA: How to generate, store, retrieve, communicate, and interpret it: Proceedings, 17:32510 (R;US)
Data Base Management Plan for the remedial investigation of Waste Area Grouping 5 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:32576 (R;US)
Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project, 17:30669 (R;US)

DATA PROCESSING
See also DISTRIBUTED DATA PROCESSING
Data acquisition and processing system for coincidence measurements, 17:31545 (R;CN;In Chinese)
Design of a PCM data compressor: Final report, 17:32554 (R;US)
PROGLOOK: User program performance monitor, 17:32540 (CM;US)
RFEDSCHK User's Manual (The RFEDS Lab Data Check routine), Environmental and Scientific Systems Information Resources: Version 1.00, 17:32561 (R;US)
Simplified modeling and code usage in the PASC-3 code system by the introduction of a programming environment: Contribution to 'International Conference on Nuclear Criticality Safety-INC'91', Oxford, UK, 9-13 September 1991, 17:32517 (R;NL)

DATING
See AGE ESTIMATION

DAUGHTER PRODUCTS
Rn gas level as an indicator to the radiological impact of Rn progeny, 17:31650 (IA;IL)
Study of the atmospheric chemistry of radon progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992, 17:31912 (R;US)

DEBRIS (NUCLEAR)
See FISSION PRODUCTS

DECANE
Measurements of cellular structure in spray detonation, 17:31158 (R;US)

DECAY
Characteristics of potential repository wastes: Volume 3, Appendix 3A, ORIGEN2 decay tables for immobilized high-level waste; Appendix 3B, Interim high-level waste forms, 17:31332 (R;US)

DECAY PRODUCTS
See DAUGHTER PRODUCTS

DECIMETER WAVE RADIATION (1-3 DM)
See RADIOWAVE RADIATION

DECIMETER WAVE RADIATION (3-10DM)
See RADIOWAVE RADIATION

DEFECTS
Nuclear reactor pressure vessel-specific flaw distribution development, 17:30900 (R;US)
Standards for burrs?, 17:31233 (R;US)

DEFORESTATION
Forest declines: Some perspectives on linking processes and patterns, 17:31749 (R;US)

DEFORMATION
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

DEFORMED NUCLEI
Nuclear superdeformation at high spins, 17:32215 (R;FR)
DEGRADATION (NUCLEAR)
See DECAY
DELAYED NEUTRONS
Recent advances in the US fission yield and delayed neutron evaluations, 17:32339 (R;US)
DELETIONS (CHROMOSOMAL)
See CHROMOSOMAL ABERRATIONS
DELTA RESONANCES (BARYON)
See N*BARYONS
DELTA RESONANCES (MESON)
See MESONS
DENITRIFICATION
Quantum chemical methods of V_2O_5-TiO_2 catalysts, 17:31666 (R;SE;In Swedish, English)
Wetlands and lakes as nitrogen traps: Research programme for the period 1 July 1990 - 30 June 1994, 17:31758 (R;SE)
DENMARK
Natural-gas-fired cogeneration plants with an electric power output of up to 1000 kW: Technology - Environment - Economy, 17:31147 (I;DK;In Danish)
Plan for national nuclear emergency preparedness, 17:31986 (I;DK;In Danish)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
DENSIMETERS
Model SM-1 ballast density gauge, 17:30783 (R;CN;In Chinese)
DENSITY
A method of noncontacting ultrasonic process monitoring, 17:31262 (PA;US)
DENSITY (PLASMA)
See PLASMA DENSITY
DEOXYCYTIDINURIA
See URINE
DEPARTMENT OF DEFENSE
See US DOD
DEPLETED URANIUM
Differences in 'in vitro' dissolution properties of settled and airborne uranium material, 17:31720 (IA;CA)
DEPLETION (NUCLEAR FUELS)
See BURNUP
DEPOSITS (GEOLOGICAL)
See GEOLOGIC DEPOSITS
DESERTRON
See SUPERCONDUCTING SUPER COLLIDER
DESORPTION
Ion desorption phenomena induced by various types of multiply charged projectiles and by photons on solid surfaces, 17:32378 (R;FR)
DESULFURIZATION
Confined zone dispersion flue gas desulfurization demonstration: Volume 1, Quarterly report No. 4, August 1, 1991–October 31, 1991, 17:30484 (R;US)
DETECTORS (RADIATION)
See RADIATION DETECTORS
DETONATION WAVES
Detonation reactions frozen by free expansion and analyzed by mass spectrometry, 17:31631 (R;US)
DETONATIONS
Detonation reactions frozen by free expansion and analyzed by mass spectrometry, 17:31631 (R;US)
Nonideal thermoequilibrium calculations using a large product species data base, 17:31635 (R;US)
DETONATORS
Advanced high-explosive flux compression generator development: The CN-III series, 17:31636 (R;US)
Development of a laser ignited all secondary explosive DDT detonator, 17:31632 (R;US)
Pilot process waste assessment for the fireset area, 17:31621 (R;US)
DETRITUS
The flux and recycling of bioactive substances in the surface sediments of the deep basins off southern California: Final report, 17:31695 (R;US)
DEUTERIUM OXIDE
See HEAVY WATER
DEUTERIUM-LITHIUM HIGH FLUX NEUTRON SOURCE FACILITY
See NEUTRON SOURCE FACILITIES
DEUTERON BEAMS
First results on D- production in the joint CEA-JAERI experiment at Cadarache, 17:32444 (R;FR)
DEUTERON REACTIONS
A possible interpretation of anomalous behaviour of proton spectrum at 0 deg from deuteron fragmentation at 9 GeV/c, 17:32330 (RA;SU;In Russian)
Observation of neutron bursts in saturation of titanium with deuterium by means of D_2O electrolysis, 17:32430 (R;SU)
DEUTERON-DEUTERON INTERACTIONS
See DEUTERON REACTIONS
DEUTERONS
Gottfried sum rule and mesonic exchanges in deuteron, 17:32112 (R;SU)
DEVELOPING COUNTRIES
See also EGYPTIAN ARAB REPUBLIC
IRAQ
ISRAEL
MOROCCO
PAKISTAN
POLAND
REPUBLIC OF KOREA
SYRIA
TURKEY
Minutes of Japan-US energy conference/Maui Meeting, 17:31052 (R;JP;In Japanese)
DEVOLATILIZATION
A simulation model for time-dependent drying, devolatilization and combustion of a single solid fuel particle, 17:31376 (R;FI)
DEVONIAN SHALES
See BLACK SHALES
DEWATERING EQUIPMENT
Energy savings with combination dryer, 17:31136 (R;FI;In Finnish)
DIAGRAMS
See also FEYNMAN DIAGRAM
Compilation of a gravity map on 1/500,000 Niigata sheet, 17:32009 (IA;JP;In Japanese)
Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan, 17:30832 (I;JP;In Japanese)
DIAMOND COUNTERS
See CRYSTAL COUNTERS
DIAPHRAGMS (THERMONUCLEAR DEVICE)
See LIMITERS
DIBARYON RESONANCES
See DIBARYONS
DIBARYONS
Experimental Medium Energy Physics: Annual progress report, June 1991–May 1992, 17:32067 (R;US)
Experimental searches for narrow dibaryons, 17:32315 (R;FR)
Multiquark stable and metastable states, 17:32329 (RA;SU)
Two-nucleon production of hyperons in an S = −1 dibaryon search, 17:32274 (R;US)
DIELECTRIC TRACK DETECTORS
Electrochemical etching of fission fragment tracks in dielectric detectors for use in chemical experiments with transplutonium elements, 17:31302 (R;SU;In Russian)
Geologichal effectiveness of nuclear trace method in uranium prospecting, 17:31543 (I;CU;In Spanish)
DIESEL ENGINES
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, April 15, 1989–July 14, 1989, 17:31153 (R;US)

A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 July 1989–14 October 1989, 17:31154 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 October 1989–14 January 1990, 17:31155 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 July 1989–14 October 1989, 17:31154 (R;US)
Engineering evaluation of the General Motors (GM) diesel rating and capabilities, 17:31040 (R;US)
Impact of fuels on diesel exhaust emissions: A chemical and biological characterization, 17:30582 (R;SE)
Soot and fuel distribution imaging in a diesel engine, 17:31157 (R;US)
The diesel engine and its potential for improvement, 17:31156 (R;SE;In Swedish)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly status report No. 7, January 15, 1989–April 15, 1989], 17:31152 (R;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Sixth quarterly progress report, October 15, 1988–January 15, 1989], 17:31151 (R;US)

DIESEL MOTORS
See DIESEL ENGINES

DIETHYLENETRIAMINEPENTAACETIC ACID
See DTPA

DIFFERENTIAL GEOMETRY
[Mathematics and string theory]: [Annual progress report], 17:32073 (R;US)

DIFFRACTION (NEUTRON)
See NEUTRON DIFFRACTION

DIFFRACTION (X-RAY)
See X-RAY DIFFRACTION

DIGESTER GAS
See METHANE

DIPOLE MOMENTS
The proton Compton effect: Recent measurements of the electric and magnetic polarizabilities of the proton, 17:32201 (R;US)

DIRECT CONTACT HEAT EXCHANGERS
Microtube strip heat exchanger: Final technical report, 17:31125 (R;US)

DIRECTIONAL DRILLING
Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report, 17:30589 (R;US)
Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)

DISADVANTAGE FACTOR
LEOPARDSPOTS: Spectrum calc with depletion, 17:32532 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32534 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32533 (CM;US)

DISCHARGES (IONIZATION)
See IONIZATION

DISCHARGES (WASTES)
See WASTE DISPOSAL

DISINTEGRATION (NUCLEAR)
See DECAY

DISLOCATIONS
Bifurcations and chaos in dislocation multiplication process, 17:31229 (R;XA)
Is there a unique effective interaction profile for dislocations?, 17:31235 (R;US)

DISPERSE SYSTEMS
See DISPERSIONS

DISPERSIONS
See also COLLOIDS
MIXTURES
SUSPENSIONS
Concentrated colloidal dispersions: Statistical mechanics, 17:31385 (RA;US)
Realization of a Lagrange-simulation model for dispersion calculations, 17:31649 (R;DE;In German)
The pendulum model for wake size prediction for a gas bubble in liquid-solid suspensions, 17:31382 (RA;US)
Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows, 17:31383 (RA;US)
Wake architectures in two-dimensional fluidization of spheres: Experiments and phenomenological description, 17:30540 (RA;US)

DISPLACEMENT FLUIDS
Oil recovery improvement through profile modification by thermal precipitation, 17:30570 (R;US)
Visualization of foam/oil in a new, high resolution, sandstone replica micromodel, 17:30568 (R;US)

DISPOSAL (WASTES)
See WASTE DISPOSAL

DISPROPORTIONATION
See OXIDATION

DISSOLUTION
Innovative methods for inorganic sample preparation, 17:31286 (R;US)

DISSOLVED MATERIALS
See SOLUTES

DISSOLVED OXYGEN
See OXYGEN

DISTILLATION
Studies on dynamics and control of distillation columns, 17:31138 (I;NO)

DISTRIBUTED DATA PROCESSING
Speedup properties of phases in the execution profile of distributed parallel programs, 17:32512 (R;US)
Standards for message-passing in a distributed memory environment, 17:32559 (R;US)

DISTRIBUTION FUNCTIONS
Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)

DISTRICT COOLING
Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems, 17:31059 (R;US)
District heating and cooling program overview: Advanced energy concepts for utilities: Programs in utility technologies, fiscal years 1990–1991, 17:31146 (R;US)

DISTRICT HEATING
See also SOLAR DISTRICT HEATING
Cogeneration and beyond: The need and opportunity for high efficiency, renewable community energy systems, 17:31059 (R;US)
District heating and cooling program overview: Advanced energy concepts for utilities: Programs in utility technologies, fiscal years 1990–1991, 17:31146 (R;US)
Experiences gained in the use of prognoses for heat demand in Esbjerg, 17:31148 (I;DK;In Danish)

DIVERGENCES (INFRARED)
See INFRARED DIVERGENCES

DIVERTORS
A design for an advanced divertor for DIII-D and ITER: The radiative slot divertor, 17:32474 (R;US)
DIII-D edge physics database, 17:32475 (R;US)
Future development of the DIII-D tokamak program, 17:32459 (R;US)

DIVING OPERATIONS
Thermal balance and operational aspects of 3 hour lock-outs at 37 bar during a simulated dive, 17:31410 (R;NO)

DNA REPAIR
Regularities of DNA synthesis repair in populations of irradiated mammalian cells, 17:31969 (RA;SU;In Russian)
Simulation and depression of repair in mutagenesis of Drosophila: adaptive response and heavy ion effect, 17:31975 (RA;SU)
DNA SEQUENCING
Human Genome, 1991–1992 program report, 17:31766 (R;US)
DOCUMENT TYPES
See also PROCEEDINGS
Evolution of the scientific paper, 17:32571 (R;US)
DOCUMENTATION
Evolution of the scientific paper, 17:32571 (R;US)
DOLOMITE
Conductivity measurements on dolomite at reaction conditions, 17:30804 (R;SE)
DOMESTIC ANIMALS
See also CATTLE
Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990, 17:31860 (R;XA)
DOPAMINE
Pharmacological properties of lisuride radiolabeled derivatives used for in vivo imaging of D2 dopamine receptors, 17:31796 (RA;US)
Quantification of ^{76}Br-bromolisuride binding to central dopamine D2 receptors studied in baboon by PET, 17:31797 (RA;US)
DORMITORIES
See RESIDENTIAL BUILDINGS
DOSE DISTRIBUTIONS
See RADIATION DOSE DISTRIBUTIONS
DOSE RATES
AISITE2: Parametric site requirement study, 17:32530 (CM;US)
SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)
DOSEMETERS
A radiation-stable intensity meter for ionizing radiation based on alloyed silicon, 17:31596 (RA;US)
Advancement and application of bubble detector technology, 17:31590 (RA;US)
Aerodynamic parameter determination in inlet orifice of CEA personal alpha dosimeter, 17:31553 (IA;CA)
An approved personal dosimetry service based on an electronic dosimeter, 17:31591 (RA;US)
Detecting low gamma radiation doses using silica glass luminescence, 17:31595 (RA;US)
Hanford radiological protection support services annual report for 1991, 17:31994 (R;US)
Space Shuttle dosimetry measurements with RME-III, 17:31597 (RA;US)
The employment of quartz glasses for dosimetry of ionic radiation, 17:31594 (RA;US)
The status of ANSI N13.11 - The dosimeter performance test standard, 17:31587 (RA;US)
Why change the x-ray conversion factors in ANSI N13.11?, 17:31588 (RA;US)
DOSIMETERS
See DOSEMETERS
DOSIMETRY
See also ELECTRON DOSIMETRY
GAMMA DOSIMETRY
MICRODOSIMETRY
NEUTRON DOSIMETRY
PERSONNEL DOSIMETRY
THERMOLUMINESCENT DOSIMETRY
SPECTDOSE: A computerized radiation dosimetry methodology for use with radiolabeled antibodies using quantitative SPECT, 17:31898 (RA;US)
DOUBLET 3 DEVICES
See DOUBLET-3 DEVICE
DOUBLET-3 DEVICE
DIII-D edge physics database, 17:32475 (R;US)
Future development of the DIII-D tokamak program, 17:32459 (R;US)
DRAG
The experimental determination of the primary system resistance for 5MW heating test reactor, 17:30970 (R;CN;In Chinese)
DRAG COEFFICIENT
See DRAG
DRAG EFFECT
See ELECTROPHORESIS
DRILL CORES
Research on backfilling and sealing of Rooms and Galleries in a repository in salt, 17:30696 (R;FR;In German)
Statistical distribution of temperatures and physical properties of geothermal areas in Japan, based on logging and core data of boreholes, 17:30839 (IA;JP;In Japanese)
DRILL HOLES
See BOREHOLES
DRINKING WATER
Analytical services - Pile area laboratories, 17:30984 (R;US)
Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)
DROPLETS
Analysis of transport mechanisms in dense fuel droplet sprays: Final report, 17:31344 (R;US)
Effects of physical properties and geometry on shapes and stability of polarizable drops in external fields, 17:32049 (R;US)
Simulation of liquid drop breakup behavior in a flow field using discrete element techniques, 17:31401 (R;US)
DRUGS
See also ANTINEOPLASTIC DRUGS
RADIOPHARMACEUTICALS
RADIOSENSITIZERS
The use of a scanning proton microprobe in AIDS research, 17:31852 (IA;AU)
DRY SCRUBBERS
Prospects for further development of spray-dry scrubbing, 17:30867 (R;SE)
DRY-STEAM SYSTEMS
See VAPOR-DOMINATED SYSTEMS
DRYING
See also SPRAY DRYING
A simulation model for time-dependent drying, devolatilization and combustion of a single solid fuel particle, 17:31376 (R;FI)
The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
DTO
See HEAVY WATER
DTPA
Effect of DTPA molecules conjugated to lysine residues on metabolism of I-125 and Tc-99m labeled T101, 17:31806 (RA;US)
DUBNA SYNCHROCYCLOTRON
Determination of the synchronous phase in a phasotron, 17:31457 (R;SU;In Russian)
On-line system for selection and measurement of currents in magnetic elements of beam lines at the JINR phasotron, 17:31434 (R;SU;In Russian)
DUSTS
See also COSMIC DUST
The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
DYMAC SYSTEM
See NUCLEAR MATERIALS MANAGEMENT
PLUTONIUM
DYNAMIC MATERIALS ACCOUNTABILITY SYSTEM
See NUCLEAR MATERIALS MANAGEMENT
PLUTONIUM
DYNAMICAL BOSON-FERMION SYMMETRY
See BOSON-FERMION SYMMETRY
DYNAMICS (BEAM)
See BEAM DYNAMICS

DYONS
Dielectric and magnetic permittivities of the QED vacuum caused by dyon, 17:32133 (R;XA)
DYSPROSIUM 156
Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)
DYSPROSIUM 158
Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)
DYSPROSIUM 160
Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)
DYSPROSIUM 162
Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)
DYSPROSIUM 164
Quadrupole electric transitions in $^{156'158'160'162'164}$Dy isotopes, 17:32237 (R;SU;In Russian)

E

E CODES
EQ3/6 V7.0: Geochemical modeling of aqueous systems, 17:32525 (CM;US)
EQ3/6 V7.1: Geochemical modeling of aqueous systems, 17:32526 (CM;US)
EARTH ATMOSPHERE
See also IONOSPHERE
A correlated K-distribution model of the heating rates for CH_4 and N_2O in the atmosphere between 0 and 60 km, 17:31676 (R;US)
Comparison of two stochastic models of scalar diffusion in turbulent flow, 17:31677 (R;US)
The importance of chemical and meteorological processes in the atmosphere for meso-scale ozone formation, 17:31660 (R;SE;In Swedish)
EARTH CRUST
Analysis and evaluation of resistivity data.: MT profiling of the southerm Tohoku district, 17:32010 (IA;JP;In Japanese)
EARTHMOVING EQUIPMENT
Development of robotics technology for remote characterization and remediationof buried waste, 17:31353 (R;US)
Remote excavation using the telerobotic small emplacement excavator, 17:31355 (R;US)
ECOLOGICAL COMMUNITIES
See ECOSYSTEMS
ECOSYSTEMS
See also AQUATIC ECOSYSTEMS
Approach and strategy for performing ecological risk assessments for the Department of Energy Oak Ridge Field Office Environmental Restoration Program: Environmental Restoration Program, 17:31699 (R;US)
ECR HEATING
Design of JAERI Gyrotron Test Facility, 17:32461 (R;JP;In Japanese)
EDDY CURRENTS
Eddy current power dissipation at sharp corners, 17:32061 (R;US)
EDUCATION
The Teachers Academy for Mathematics and Science: Executive summary and program activities update, 17:32481 (R;US)
EDUCATIONAL TOOLS
The Teachers Academy for Mathematics and Science: Executive summary and program activities update, 17:32481 (R;US)
EFFLUENTS (CHEMICAL)
See CHEMICAL EFFLUENTS
EFFLUENTS (GASEOUS)
See GASEOUS WASTES
EFFLUENTS (LIQUID)
See LIQUID WASTES
EFFLUENTS (RADIOACTIVE)
See RADIOACTIVE EFFLUENTS
EGYPTIAN ARAB REPUBLIC
Intermediate evaluation of USAID/Cairo energy policy planning project, 17:31049 (R;US)
EHF RADIATION
See MICROWAVE RADIATION
EINSTEIN-DE SITTER MODEL
See COSMOLOGICAL MODELS
ELASTIC PROPERTIES
See ELASTICITY
ELASTIC SCATTERING
See also RUTHERFORD SCATTERING
Low energy $^{16}O+^{208}Pb$ elastic scattering: an attempt to analyze the microscopic effective potential, 17:32318 (R;FR)
ELASTICITY
A method of noncontacting ultrasonic process monitoring, 17:31262 (PA;US)
Bifurcations in elastic-damaging materials, 17:32366 (R;US)
Measurement of atomic elastic constants by pulsed neutron powder diffraction, 17:32041 (R;US)
Thermodynamically consistent theories for elastoplasticity coupled with damage, 17:31242 (R;US)
ELECTRIC APPLIANCES
Labelling electrical household appliances to show their consumption of electicity: Joint Nordic proposal, 17:31110 (I;DK)
Labelling electrical household appliances to show their consumption of electricity: Appendix to the Joint Nordic proposal, 17:31111 (I;DK)
Principles for efficiency standards for the electricity consumption of household appliances: Joint Nordic Proposal, 17:31112 (I;DK;In Danish)
ELECTRIC ARCS
Hot-wire vs laser, is there a difference?, 17:31633 (R;US)
ELECTRIC BATTERIES
See also THERMAL BATTERIES
Results of advanced batter technology evaluations for electric vehicle applications, 17:31043 (R;US)
ELECTRIC CABLES
Solid state safety jumper cables, 17:31150 (PA;US)
ELECTRIC COILS
See also MAGNET COILS
Shielded helix traveling wave cathode ray tube deflection structure, 17:31415 (PA;US)
ELECTRIC CONDENSERS
See CAPACITORS
ELECTRIC CONDUCTORS
Eddy current power dissipation at sharp corners, 17:32061 (R;US)
Model for impedance of an ionic conductor sandwiched between blocking electrodes, 17:31321 (R;US)
ELECTRIC FIELDS
Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 1, Text, 17:32004 (R;US)
Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 2, Appendices, 17:32005 (R;US)
ELECTRIC FILTERS
Spatial filtring and thermocouple spatial filter, 17:31605 (R;CN;In Chinese)
ELECTRIC MOTORS
See also SUPERCONDUCTING MOTORS
Energy efficient motors reference guide: First edition, 17:31144 (R;US)
Single-shaft electric propulsion system technology development program – ETX-II: Final technical report, 17:31186 (R;US)
ELECTRIC POWER
Alaska Power Administration federal power program, Juneau, Alaska: Fiscal year 1991, 17:31046 (R;US)
Electricity from biomass: A development strategy, 17:30801 (R;US)
Stochastic methods in energy planning: Application to expansion planning and short-term load forecasting, 17:31068 (I;NO)
Western Area Power Administration: Combined power system financial statements and supplemental schedules (Combined Power System Financial Statements and Supplemental

Schedules. September 30, 1991. (With Independent Auditor's Report Thereon)), 17:31047 (R;US)

ELECTRIC UTILITIES
A preliminary study of the energy management system of middle-sized electric utilities, 17:31074 (R;FI;In Finnish)
SAGEWASP: Optimal electric utility expansion, 17:32524 (CM;US)

ELECTRIC-POWERED VEHICLES
See also HYBRID ELECTRIC-POWERED VEHICLES
Single-shaft electric propulsion system technology development program – ETX-II: Final technical report, 17:31186 (R;US)

ELECTRICAL ENGINEERING
DOE Fundamentals Handbook: Electrical Science, Volume 1, 17:30927 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 2, 17:30928 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 3, 17:30929 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 4, 17:30930 (R;US)

ELECTRICAL INSULATION
Analysis of plasma-treated wire insulation, 17:31622 (R;US)

ELECTRICAL TRANSIENTS
Numerical simulation for HT-6M tokamak electrical transient behaviours, 17:32447 (R;CN)

ELECTRICITY
Short-term energy outlook: Quarterly projections, Third quarter 1992, 17:31066 (R;US)

ELECTROCHEMICAL CELLS
See also ELECTRIC BATTERIES
PHOTOELECTROCHEMICAL CELLS
Electrochemical oxidation of organic materials, 17:31141 (PA;US)

ELECTRODES
See also CATHODES
Electrode materials for solid state batteries, 17:31044 (I;DK;In Danish, English)
Oxygen electrode reaction in molten carbonate fuel cells: Final report, September 15, 1987–September 14, 1990, 17:31086 (R;US)

ELECTRODYNAMICS
See also QUANTUM ELECTRODYNAMICS
More on the radiation reaction and runaway solutions in classical electrodynamics, 17:32087 (R;XA)
On classical electrodynamics with distribution-valued sources, 17:32110 (R;SU)
Some problems of relativistic electrodynamics, 17:32106 (R;SU)

ELECTROKINETICS
See ELECTRODYNAMICS

ELECTROLYTE TILES
See MATRIX MATERIALS

ELECTROLYTIC CELLS
Measurements of excess heat from a Pons-Fleischmann type electrolytic cell using palladium sheet, 17:32432 (R;US)

ELECTROMAGNETIC FIELDS
Temporal scattering and response software users' manual: Version 2.3, 17:32065 (R;US)

ELECTROMAGNETIC FORM FACTORS
First polarization experiments at MAMI B, 17:32261 (RA;FR)
Nucleon form factors, 17:32260 (RA;FR)

ELECTROMAGNETIC INTERACTIONS
See also ELECTROPRODUCTION
PHOTON-PHOTON INTERACTIONS
PHOTOPRODUCTION
Improvement in the EGS4 code system - general purpose electron-photon Monte Carlo transport code system, 17:31583 (RA;JP;In Japanese)

ELECTROMAGNETIC SURVEYS
See also MAGNETOTELLURIC SURVEYS
Characterization of reservoir rocks and fluids by surface electromagnetic transient methods: Annual report, January 1991–January 1992, 17:30561 (R;US)

ELECTROMAGNETIC TRANSITIONS
See ENERGY-LEVEL TRANSITIONS

ELECTROMIGRATION
See ELECTROPHORESIS

ELECTRON ACCEPTOR
See ELECTRONS

ELECTRON BEAMS
3-dimensional bundle adjustments in industrial metrology: A comparison, 17:31525 (R;US)
Polarized electron physics at ELSA, 17:31454 (RA;FR)
Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons, 17:32259 (R;FR)
Spin correlations in photo- and electro-disintegration of the few-body systems, 17:32265 (RA;FR)
Two-flux Monte Carlo approach to electron diffusion in solids, 17:32345 (R;SU)

ELECTRON CORRELATION
Physics of correlated systems: Progress report, December 1, 1991–November 30, 1992, 17:32358 (R;US)

ELECTRON CYCLOTRON-RESONANCE HEATING
See ECR HEATING

ELECTRON DONOR
See ELECTRONS

ELECTRON DOSIMETRY
Point-pair distributions for internal dosimetry, 17:31897 (RA;US)

ELECTRON PARAMAGNETIC RESONANCE
See ELECTRON SPIN RESONANCE

ELECTRON SOURCES
Polarized electron sources for linear colliders, 17:31524 (R;US)
Polarized electron sources for stretcher/storage rings, 17:31486 (RA;FR)
The Orsay polarized electron source, 17:31485 (RA;FR)

ELECTRON SPIN RESONANCE
Oxygen concentration measurements using the ESR line modification of PcLi molecules, 17:31289 (R;FR)

ELECTRON TRANSFER
Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)

ELECTRON-DEUTERON INTERACTIONS
A combined analysis of SLAC experiments on deep inelastic e-p and e-d scattering, 17:32183 (R;US)

ELECTRON-ION COLLISIONS
Self-generated stochastic heating in an rf discharge: Annual progress report, May 15, 1991–May 14, 1992, 17:32410 (R;US)

ELECTRON-NEUTRON INTERACTIONS
On different values of the neutron-electron scattering amplitude and neutron mean square charge radius obtained from the low-energy dependence of the scattering amplitude, 17:32325 (R;SU)

ELECTRON-POSITRON COLLISIONS
Testing the neutral Higgs sector of the M.S.S.M. with a 300-500 GeV e^+e^- collider, 17:32147 (R;FR)

ELECTRON-PROTON INTERACTIONS
A combined analysis of SLAC experiments on deep inelastic e-p and e-d scattering, 17:32183 (R;US)

ELECTRONIC CIRCUITS
See also TIMING CIRCUITS
Nickel plating of flexible products: Statistical optimization, 17:31414 (R;US)
Temperature tracking SPICE macro-model for laser and LED driven opto-coupler assemblies, 17:31417 (R;US)

ELECTRONIC DATA PROCESSING
See DATA PROCESSING

ELECTRONIC EQUIPMENT
See also ANALOG-TO-DIGITAL CONVERTERS
OPTICAL SCANNERS
POWER SUPPLIES
RADIO EQUIPMENT
Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report, 17:31131 (R;US)

ELECTRONS
A model for electron and beta energy deposition within trabecular bone, 17:31895 (RA;US)
A recovery study of electron irradiated Al-Li alloys, 17:32369 (R;FR)

Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)
Calculations of scaled dose kernels for electrons in tissue, 17:31896 (RA;US)
Measurement of spin-dependent electron scattering from a polarized ^{3}He internal target, 17:32263 (RA;FR)
Transport processes of conversion electron in surface layers, 17:32371 (R;CN;In Chinese)

ELECTROPHORESIS
The compactness of front tracking for chromatography electrophoresis and incompressible multiphase flow, 17:32365 (R;US)

ELECTROPRODUCTION
Electroproduction of polarized Λ's, 17:32187 (R;FR)

ELECTROREFINING
The suitability and operational cost of the electrolytic phenol wate water purification, 17:31140 (R;FI;In Finnish)

ELECTROWEAK MIXING ANGLE
See WEINBERG ANGLE

ELEMENTARY PARTICLES
See also BEAUTY PARTICLES
CHARM PARTICLES
HADRONS
MASSLESS PARTICLES
POSTULATED PARTICLES
BRST field theory of relativistic particles, 17:32465 (R;NL)
Research program in elementary particle physics, Task A; Outstanding Junior Investigator Program, Task B: Final report, July 1, 1985–December 31, 1991 and Final report, July 1, 1987–December 31, 1991, 17:32066 (R;US)
[Elementary particle physics research]: Final report, [1 January 1991–31 January 1992], 17:32068 (R;US)

EMANOMETERS
The transient response of radon and thoron chambers, 17:31559 (IA;CA)

EMERGENCIES
See ACCIDENTS

EMERGENCY PLANS
The environmental effects of the nuclear accidents in Chernobylsk (1986) and in the Ural mountains, 17:30965 (RA;IL;In Hebrew)

EMERGENCY PROVISIONS
See EMERGENCY PLANS

EMERGENCY RODS
See SCRAM RODS

EMISSION
See also NEUTRON EMISSION
Combustion characterization of the blend of plant coal and recovered coal fines: Technical report, December 1, 1991–February 29, 1992, 17:30552 (R;US)

EMPLOYEES
See PERSONNEL

ENDANGERED SPECIES
Endangered Species Program Naval Petroleum Reserves in California: Annual report FY90, 17:30579 (R;US)

ENDOTHELIUM
Effect of ^{60}Co radiation on the fibrinolysis and anticoagulation of endothelial cells, 17:31868 (R;CN;In Chinese)

ENERGY CONSERVATION
America's best: Outstanding state energy grant projects, 17:31064 (R;US)

ENERGY CONSUMPTION
Exergy measure for the energy use of Finland economy in 1985, 17:31090 (R;FI;In Finnish)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 2, 17:31055 (R;JP;In Japanese)
The analysis of the energy consumption of an industrial building and development of the monitoring, 17:31137 (R;FI;In Finnish)

ENERGY DEPOSITION
Study of electron-beam-pumped KrF laser kinetics and calculation of energy deposition, 17:32048 (R;CN;In Chinese)

ENERGY EXCHANGE
See ENERGY TRANSFER

ENERGY POLICY
Survey of the petroleum trend in Europe, 17:31067 (R;JP;In Japanese)

ENERGY SHORTAGES
Survey of the petroleum trend in Europe, 17:31067 (R;JP;In Japanese)

ENERGY SUPPLIES
Short-term energy outlook: Quarterly projections, Third quarter 1992, 17:31066 (R;US)
Stochastic methods in energy planning: Application to expansion planning and short-term load forecasting, 17:31068 (I;NO)

ENERGY TRANSFER
See also HEAT TRANSFER
A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)

ENERGY-LEVEL TRANSITIONS
Oscillator strengths for transition among low-lying quartet terms in the nitrogen isoelectronic sequence, 17:32238 (R;NO)

ENERGY-MOMENTUM TENSOR
On the energy-momentum tensors for field theories in spaces with affine connection and metric: Conditions for existence of energy-momentum tensors, 17:32103 (R;SU)
On the energy-momentum tensors for field theories in spaces with affine connection and metric: Generalized Bianchi identities and different energy-momentum tensors, 17:32102 (R;SU)
On the energy-momentum tensors for field theories in spaces with affine connection and metric: Conditions for existence of energy-momentum tensors, 17:32103 (R;SU)

ENGLAND
See UNITED KINGDOM

ENHANCED RECOVERY
See also THERMAL RECOVERY
[National Institute for Petroleum and Energy Research] monthly progress report for June 1992, 17:30574 (R;US)

ENKEPHALINS
Internal energy effects on the solvation and reactivity of multiply charged biomolecules for electrospray ionization mass spectroscopy, 17:31764 (R;US)

ENTHALPY
The standard molar enthalpies of formation of BaSiO$_3$(s) and Ba$_2$SiO$_4$(s), 17:30960 (R;NL)

ENTROPY
The calculations of magnetic diffusion constant and Kolmogorov entropy in a stochastic field region, 17:32396 (R;CN;In Chinese)

ENTRY CONTROL SYSTEMS
Access control issues and solutions for large sites, 17:30778 (R;US)

ENVIRONMENT
Data Base Management Plan for the remedial investigation of Waste Area Grouping 5 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:32576 (R;US)
The use of biomarkers to assess environmental health, 17:31692 (R;US)

ENVIRONMENTAL MATERIALS
Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)

ENVIRONMENTAL PROTECTION AGENCY
See US EPA

ENVIRONMENTAL TRANSPORT
See also RADIONUCLIDE MIGRATION
A finite element/finite difference approach for modeling three-dimensional flow and pollutant dispersion around structures, 17:31673 (R;US)

ENZYME ACTIVITY
Radiosensitivity of L5178Y mice lymphoma cells and state of antioxidant enzyme system, 17:31971 (RA;SU;In Russian)

EPA
See US EPA

EPR
See ELECTRON SPIN RESONANCE

EPSILON RESONANCES
See MESONS

EQUIPMENT INTERFACES
HIPPI and Fibre Channel, 17:32557 (R;US)
ERBIUM IONS
Optical properties of Er^{3+} and Tm^{3+} doped Y_2SiO_5, 17:31250 (R;FR)
ERYTHROBLASTS
See BONE MARROW CELLS
ERYTHROCYTES
Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on ligand exchange and binding with hemoglobin: Comparison with In-111 tropolone, 17:31921 (RA;US)
ESCHERICHIA COLI
Effect of millimeter radiation on radiationinduced repair of genome conformation state, 17:31957 (IA;SU;In Russian)
Induction of SOS-system in E.Coli under γ-irradiation in the presence of anoxic sensitizer TAN, 17:31964 (RA;SU;In Russian)
Post-irradiation DNA degradation in certain repair-deficient E.Coli strains, 17:31965 (RA;SU)
ESR
See ELECTRON SPIN RESONANCE
ESTUARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS
ETA MESONS
$\eta,K_L \to \pi^+\pi^-\gamma$ as tests of chiral models, 17:32177 (R;FR)
Chiral corrections to the anomalous 2γ decays of π^0, η and η', 17:32182 (R;US)
ETA-549
See ETA MESONS
ETA-700 RESONANCES
See MESONS
ETHANOL
In vivo studies of ethanol on prolactin and luteinizing hormone in rats, 17:32003 (RA;US)
Simultaneous saccharification and fermentation (SSF) using cellobiose fermenting yeast Brettanomyces custersii (CBS 5512), 17:30807 (PA;US)
ETHERS
Synthesis of octane enhancers during slurry-phase Fischer-Tropsch: Quarterly technical progress report No. 5, October 1, 1991–December 31, 1991, 17:30454 (R;US)
ETHINE
See ACETYLENE
ETHOCEL
See CELLULOSE
ETHERS
ETHYL ALCOHOL
See ETHANOL
ETHYNE
See ACETYLENE
EUROPEAN COMMUNITIES
The european programme on negative ion beam development, 17:32442 (R;FR)
EUROPIUM 152
Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments, 17:31877 (R;CN;In Chinese)
EVACUATED TUBE COLLECTORS
Participation in multilateral effort to develop high performance integrated CPC evacuated collectors: Final report, July 1, 1986–May 31, 1987, 17:30828 (R;US)
EVALUATION
Study of geothermal resource evaluation by potential water volume method, 17:30834 (IA;JP;In Japanese)
EVAPORATORS
Advanced Cooling Technology, Inc. quarterly technical progress report, 17:31097 (R;US)
EXCAVATORS
See EARTHMOVING EQUIPMENT
EXCHANGE (HEAT)
See HEAT TRANSFER
EXCRETION ANALYSIS
See PERSONNEL MONITORING
EXHAUST GASES
Emission of non-combusted hydrocarbons from stationary motors and turbines, 17:31663 (I;DK;In Danish)
Impact of fuels on diesel exhaust emissions: A chemical and biological characterization, 17:30582 (R;SE)
EXPERIMENTAL NEOPLASMS
External beam and radioimmunotherapy dosimetry comparison of colorectal xenografts, 17:31883 (RA;US)
Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated $F(ab')_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8, 17:31832 (RA;US)
Improved localization of tumor with streptavidin and labeled biotin as a substitute for antibody, 17:31830 (RA;US)
Radioiodinated phospholipid ether analogs as noninvasive tumor imaging agents, 17:31784 (RA;US)
Tumor-specific Y-90 species in solution for animal and human tumor therapy, 17:31786 (RA;US)
Uptake of radiolabeled 1-(2-deoxy-2-fluoroarabinofuranosyl)-5-halouracils by experimental tumors in vivo, 17:31785 (RA;US)
EXPERT SYSTEMS
Identifying and building an expert system: The programmer's role, 17:32513 (R;US)
EXPLORATION
Physical and environmental surveillance in uranium exploration galleries, 17:30626 (IA;CA)
EXPLORATORY WELLS
Comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data, 17:30843 (IA;JP;In Japanese)
Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan, 17:30832 (I;JP;In Japanese)
EXPLOSIVES
See also CHEMICAL EXPLOSIVES
NUCLEAR EXPLOSIVES
A method of using γ-ray spectrum of ^{40}K to detect firecrackers, 17:30785 (R;CN;In Chinese)
Development of robotics technology for remote characterization and remediationof buried waste, 17:31353 (R;US)
EXPOSURE (RADIATION DOSES)
See RADIATION DOSES
EXTRACTION (BEAM)
See BEAM EXTRACTION
EXTRACTION COLUMNS
Laboratory studies of the behavior of undissolved solids in both pulsed and packed column extraction systems, 17:31308 (R;US)
EXTREME ULTRAVIOLET RADIATION
The ALEXIS experiment: Current status and performance, 17:32054 (R;US)
EXTREMELY HIGH FREQUENCY RADIATION
See MICROWAVE RADIATION

F

F CODES
Independent verification and validation testing of the FLASH computer code, Versiion 3.0, 17:31698 (R;US)
Thermal stress and strain analysis in traveling autogenous welds, 17:31363 (R;US)
F-1540 RESONANCES
See MESONS
FACE CENTERED CUBIC
See FCC LATTICES
FACILITIES (NUCLEAR)
See NUCLEAR FACILITIES
FACILITIES (STORAGE)
See STORAGE FACILITIES
FACILITIES (TEST)
See TEST FACILITIES

FACILITIES (UNDERWATER)
See UNDERWATER FACILITIES
FAEROE ISLANDS
Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)
FARADAY GENERATORS
See MHD GENERATORS
FARM ANIMALS
See DOMESTIC ANIMALS
FAROE ISLANDS
See FAEROE ISLANDS
FAST FLUX TEST FACILITY REACTOR
See FFTF REACTOR
FAST NEUTRONS
Optical study of radiation damage in A-SI02 and problems of selective dosimetry of fast neutrons, 17:31988 (RA;US)
FATIGUE
See also THERMAL FATIGUE
A survey of fatigue monitoring in the nuclear power industry, 17:30941 (R;US)
FAULT TREE ANALYSIS
The development and improvement of a fault tree program, 17:32507 (R;CN;In Chinese)
FAULT TREE SYSTEMS
See FAULT TREE ANALYSIS
FCC LATTICES
Is there a unique effective interaction profile for dislocations?, 17:31235 (R;US)
FEDERAL REPUBLIC OF GERMANY
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
FEED MATERIALS PRODUCTION CENTER
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)
FEEDWATER
Analytical services - Pile area laboratories, 17:30984 (R;US)
FERMENTATION ALCOHOL
See ETHANOL
FERMION-BOSON SYMMETRY
See BOSON-FERMION SYMMETRY
FERMIONS
See also BARYONS
QUARKS
Massive fermion dispersion relation at finite temperature, 17:32150 (R;FR)
FERNALD PRODUCTION PLANT
See FEED MATERIALS PRODUCTION CENTER
FERRIC COMPOUNDS
See IRON COMPOUNDS
FERRITIC STEELS
The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria, 17:31210 (R;FR;In French)
FERROCYANIDES
Fiscal year 1992 program plan for evaluation of ferrocyanide in the Hanford Site waste tanks: Revision 2, 17:30739 (R;US)
FERROUS COMPOUNDS
See IRON COMPOUNDS
FESHBACH-PORTER-WEISSKOPF MODEL
See OPTICAL MODELS
FETUSES
Distribution of ionic indium and gallium in pregnant and non-pregnant animals, 17:31885 (RA;US)
FEYNMAN DIAGRAM
A simple formula for reducing Feynman diagrams to scalar integrals, 17:32097 (R;SU)
General results for massive N-point Feynman diagram with different masses, 17:32096 (R;SU)
FFTF REACTOR
Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B, Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, S, 17:30902 (R;US)
FIELD THEORIES
See also QUANTUM FIELD THEORY
Abelian gauge theories on homogeneous spaces, 17:32090 (R;XA)
Beltrami parametrization and gauging of Virasoro and w-infinity algebras, 17:32078 (R;XA)
Chiral Schwinger model at finite temperature, 17:32088 (R;XA)
Invariant structures in gauge theories and confinement, 17:32107 (R;SU)
Nonlinear realisations of $\omega_{1+\infty}$, 17:32076 (R;XA)
On one-dimensional topological and conformal field theories, 17:32084 (R;XA)
Time-translation noninvariance of temporal gauge propagator, 17:32079 (R;XA)
FIELDS (ELECTRIC)
See ELECTRIC FIELDS
FIELDS (ELECTROMAGNETIC)
See ELECTROMAGNETIC FIELDS
FIELDS (MAGNETIC)
See MAGNETIC FIELDS
FILMS
See also SUPERCONDUCTING FILMS
Preparation of Y-Ba-Cu-O superconducting film above liquid nitrogen temperature, 17:32386 (R;CN;In Chinese)
FILTERS
See also AIR FILTERS
ELECTRIC FILTERS
Visit of Wayne Hazen, Los Alamos October 15–16, 1952, 17:31356 (R;US)
FILTERS (ELECTRIC)
See ELECTRIC FILTERS
FINANCIAL DATA
DOE Personal Property Management Factbook, Fiscal Year 1991, 17:32489 (R;US)
FINANCIAL MANAGEMENT
See US DOE PROGRAM MANAGEMENT
FINGERPRINTING (OIL SPILLS)
See OIL SPILLS
PATTERN RECOGNITION
FINISHING (SURFACE)
See SURFACE FINISHING
FINLAND
Emissions of nitrogen oxides in Finland in the 1980s and 1990s, 17:31682 (R;FI;In Finnish)
Environmental protection in Finland: National report 1987, 17:31058 (R;FI)
Finnish research project on acidification (HAPRO), 17:31683 (R;FI)
Research needs on the natural gas field in Finland, 17:30592 (R;FI;In Finnish)
Research programme for air quality 1986-1990, 17:31681 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 7, 17:30497 (R;FI;In Finnish)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
FIREDAMP
See METHANE
FIRES
Summary of a graded approach to fire hazard analysis, 17:30762 (R;US)
FIREWOOD
See WOOD FUELS
FISH CULTURE
See FISHERIES
FISH HATCHERIES
See FISHERIES
FISHERIES
South Fork Clearwater River habitat enhancement - Nez Perce National Forest, 17:30818 (R;US)
Umatilla Satellite and Release Sites Project: Final siting report, 17:30817 (R;US)

FISHES
- *See also* TROUT
- Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)
- Performances of models for predicting mercury concentrations in fresh-water fish after chronic releases into rivers: Applications to a test scenario of the BIOMOVS study, 17:31754 (R;JP)

FISSION FRAGMENT DETECTION
- Effectiveness in detecting fission fragments with ionization chambers, 17:32342 (I;CU;In Spanish)

FISSION PRODUCT RELEASE
- Activities of the Commission of the European Communities in the area of iodine chemistry in severe reactor accidents, 17:30871 (RA;JP)
- Analysis of iodine source term from a small BWR during a postulated severe accident using IMPAIR 2/M code, 17:30875 (RA;JP)
- Improvement and validation of tellurium transport models in the RAFT code, 17:30946 (RA;JP)
- Iodine chemical form in LWR reactor accidents: Regulatory perspectives in the United States, 17:30919 (RA;JP)
- Iodine chemical forms in LWR severe accidents, 17:30874 (RA;JP)
- Overview of the ACF iodine project, 17:31013 (RA;JP)
- The Canadian programme on iodine chemistry in reactor safety, 17:31014 (RA;JP)
- The modelling of iodine behavior for assessing the radiological consequences of a design basis accident, 17:30895 (RA;JP)
- Validation of IMPAIR 2 code using ACE-test results from the Radioiodine Test Facility (RTF), 17:32551 (RA;JP)

FISSION PRODUCTS
- CURIE: Fission product inventory decay history, 17:32537 (CM;US)
- Development and status of fission-product yield data and applications to calculations of decay properties, 17:32340 (R;US)

FISSION YIELD
- Recent advances in the US fission yield and delayed neutron evaluations, 17:32339 (R;US)

FISSIONABLE MATERIALS MANAGEMENT
- *See* NUCLEAR MATERIALS MANAGEMENT

FISSURED FORMATIONS
- *See* FRACTURED RESERVOIRS

FLAME PROPAGATION
- Studies in nonlinear problems of energy: Progress report, January 1, 1992–December 31, 1992, 17:31345 (R;US)

FLAWS
- *See* DEFECTS

FLOODING FLUIDS
- *See* DISPLACEMENT FLUIDS

FLOW (FLUID)
- *See* FLUID FLOW

FLOW MODELS
- The validation of horizontal well models using a physical model of heat flow in an anisotropic conductor, 17:30572 (R;US)

FLOW RATE
- A new apparatus for continuous countercurrent flow of solids and liquids, 17:31124 (R;US)

FLUE GAS
- Anion-exchange resin-based desulfurization process: Quarterly technical progress report, April 1, 1992–June 30, 1992, 17:30864 (R;US)
- Confined zone dispersion flue gas desulfurization demonstration: Volume 1, Quarterly report No. 4, August 1, 1991–October 31, 1991, 17:30484 (R;US)
- Control of mercury emissions from coal-fired boilers, 17:30475 (R;US)
- LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)
- LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991, 17:30480 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991, 17:30478 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991, 17:30477 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990, 17:30482 (R;US)
- Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990, 17:30476 (R;US)
- Reheating of flue gas in small gas-fired condensing boilers, 17:31109 (R;SE;In Swedish)

FLUENCE (NEUTRON)
- *See* NEUTRON FLUENCE

FLUID FLOW
- *See also* MULTIPHASE FLOW
  - TURBULENT FLOW
  - TWO-PHASE FLOW
- An improved numerical model for the investigation of thermal hydraulic phenomena with applications to LMR reactor components, 17:30911 (R;US)
- Analysis and evaluation of knowledge base and rule. Part 1.: Geochemical classification and significance of original water relating to geothermal system, 17:30851 (IA;JP;In Japanese)
- DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 3, 17:30933 (R;US)
- Independent verification and benchmark testing of the UNSAT-H computer code, Version 2.0, 17:31697 (R;US)
- Independent verification and validation testing of the FLASH computer code, Versiion 3.0, 17:31698 (R;US)
- On fluid power control. With special reference to multiload conditions in load sensing systems, 17:31361 (R;SE)
- Total System Performance Assessment Code (TOSPAC): Volume 2, User's guide: Yucca Mountain Site Characterization Project, 17:30717 (R;US)
- VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

FLUID INJECTION
- *See also* STEAM INJECTION
- Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report, 17:30567 (R;US)

FLUID MECHANICS
- *See also* HYDRAULICS
  - HYDRODYNAMICS
- A review of numerical computations on the mechanics of deformable particles using boundary integral methods, 17:31384 (RA;US)

FLUIDIZED BED
- *See* FLUIDIZED BEDS

FLUIDIZED BED BOILERS
- Circulating fluidized bed with optimal control of process parameters to achieve better environmental conditions and flexibility in operation, 17:31408 (I;DK)
- Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)

FLUIDIZED BED HEAT EXCHANGERS
- Time-continuous dynamic models for heat exchangers, 17:30845 (I;DK;In Danish)

FLUIDIZED BEDS
- Yield stresses in uniformly fluidized suspensions, 17:30541 (RA;US)

FLUIDIZED-BED COMBUSTION
- A dimensional model for char combustion in a circulating fluidized bed, 17:30539 (R;FI)

FLUIDIZED-BED COMBUSTORS
- NUCLA Circulating Atmospheric Fluidized Bed Demonstration Project: 1989 Annual report, [January 1989–December 1989], 17:30543 (R;US)

Reaction kinetics of coal combustion: A literature review, 17:30538 (R;FI)

FLUIDS

See also DISPLACEMENT FLUIDS
GASES
GEOTHERMAL FLUIDS
LIQUIDS

Variable path length spectrophotometric probe, 17:31611 (PA;US)

FLUORESCENCE SPECTROSCOPY

The experimental setup for optical spectra measurements with a pulsed laser, 17:31579 (R;SU;In Russian)

FLUORIMETRY

See FLUORESCENCE SPECTROSCOPY

FLUORINATED ALICYCLIC HYDROCARBONS

Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)

FLUORINATED ALIPHATIC HYDROCARBONS

Laboratory measurement of miscibility and pressure/temperature relationships of n-C_4F_{10}/CFC-114 mixtures, 17:31319 (R;US)

FLUORINE

Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)

FLUORINE FLUORIDES

See FLUORINE

FLUX (NEUTRON)

See NEUTRON FLUX

FLY ASH

Characterization of fly ash, 17:30462 (RA;US)

Concentration of light homologs of superheavy elements in coal combustion, 17:31724 (R;SU;In Russian)

Measurement of radiant properties of fly ash dispersions, 17:30464 (RA;US)

Mechanism of surface enrichment and adhesion of coal combustion particulates: First quarterly report, February 1987, 17:30548 (R;US)

FOAMS

Aerogels, emulsions, and composites: Controlling structure with organic sol-gel chemistry, 17:31282 (R;US)

Determination of the permeability of carbon aerogels by gas flow measurements, 17:31280 (R;US)

FOOD CHAINS

Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth, 17:30761 (RA;US)

Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992, 17:32000 (R;US)

FOOD IRRADIATION

See FOOD PROCESSING

FOOD PROCESSING

Industrial innovations for tomorrow: Advances in industrial energy-efficiency technologies: Degradable plastic made from potato peels, 17:31128 (R;US)

FORESTRY

Biomass fuels - effects on the carbon dioxide budget, 17:30813 (R;SE)

Part 1: Logging residues in piles - Needle loss and fuel quality. Part 2: Nitrogen leaching under piles of logging residues, 17:30806 (R;SE;In Swedish)

FORMOSA

See TAIWAN

FORT ST. VRAIN REACTOR

See VRAIN REACTOR

FOSSIL FUEL RESERVES

See FOSSIL FUELS
RESERVES

FOSSIL FUELS

See also COAL
NATURAL GAS
OIL SHALES
PEAT
PETROLEUM
SHALE OIL

The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)

FOSSIL-FUEL POWER PLANTS

Energy and environment: transitions in Eastern Europe: Book of abstracts, 17:30485 (I;CS)

Integrated dry NO_x/SO_2 emissions control system: Quarterly report No. 5, January 1–March 31, 1992, 17:30865 (R;US)

Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)

LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)

LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)

FRACTURE MECHANICS

Application of probabilistic fracutre mechanics to allocation of NDT for nuclear pressure vessels, 17:30949 (R;SE)

FRACTURE PROPERTIES

Effect of a sustained load and a low loading rate on 16 MND5 steel ductile tearing resistance, 17:31207 (R;FR;In French)

FRACTURE STRENGTH

See FRACTURE PROPERTIES

FRACTURE TOUGHNESS

See FRACTURE PROPERTIES

FRACTURED FORMATIONS

See FRACTURED RESERVOIRS

FRACTURED RESERVOIRS

Natural fracture systems studies, 17:30587 (R;US)

FRAGMENTS (DECAY)

See DECAY

FRANCE

Monthly results of measurements. February 1992, 17:31670 (R;FR;In French)

Monthly results of measurements. January 1992, 17:31669 (R;FR;In French)

Monthly results of measurements; December 1991, 17:30968 (R;FR;In French)

FREE CONVECTION

See NATURAL CONVECTION

FREE ELECTRON LASERS

One and three dimensional numerical simulation of millimeter wave fel amplifiers with rectangular waveguide, 17:31483 (R;CN;In Chinese)

Relativistic cloud-in-cell simulation of free-electron laser (FEL) with considering space charge effects, 17:31482 (R;CN;In Chinese)

Scaling of gain with energy spread and energy in the PEP FEL, 17:31529 (R;US)

FREONS

CFC environmental problems and cooling technology, 17:31647 (R;DK;In Danish)

Modelling of freon heat transfer in water under supercritical pressure, 17:31392 (R;SU;In Russian)

FRESH WATER ECOSYSTEMS

See AQUATIC ECOSYSTEMS

FRESNEL LENS

Process designed for experimentation for increased-caliper Fresnel lenses, 17:30829 (R;US)

FROST

Frost formation - A literature study, 17:31397 (RA;SE;In Swedish)

Frost growth in convection between two plates with one cold side, 17:31398 (RA;SE;In Swedish)

Theoretical and experimental studies of frost between two plates, 17:31396 (R;SE;In Swedish)

FRUIT (SEEDS)

See SEEDS

FRUITS

See also TOMATOES

Development of radiation preservation technique in Beijing, 17:31856 (R;CN)

FTR REACTOR (RICHLAND)

See FFTF REACTOR

FUEL ASSEMBLIES

See also FUEL ELEMENT CLUSTERS

Development and research of in-core transducers at IAE (Institute of Atomic Energy), 17:31606 (R;CN;In Chinese)
Manufacturing technology of top nozzle and bottom nozzle in fuel assembly for nuclear power plant, 17:30883 (R;CN;In Chinese)
The in-pile proving test for fuel assembly of Qinshan nuclear power plant, 17:30881 (R;CN;In Chinese)

FUEL BUNDLES
See FUEL ELEMENT CLUSTERS

FUEL CANS
Inspection of irradiated Mark 18 fuel tubes, 17:30976 (R;US)

FUEL CHANNELS
An experimental investigation on turbulent flow through symmetric wall-subchannels of rod bundles, 17:31378 (R;CN;In Chinese)

FUEL COOLING INSTALLATIONS
See SPENT FUEL STORAGE

FUEL CYCLE
Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
The model and optimization of HTGR nuclear fuel cycle: Pt. 1: Mono-reactor model, 17:30923 (R;CN;In Chinese)
The model and optimization of HTGR nuclear fuel cycle: Pt. 2: Multi-reactor model, 17:30922 (R;CN;In Chinese)

FUEL ELEMENT CLUSTERS
Experimental study on critical heat flux with long rod bundle, 17:30886 (R;CN;In Chinese)

FUEL ELEMENT FAILURE
Pre-pulse irradiation examination, NSRR pulse irradiation and post-pulse irradiation examination of MH-2 fuel rod, 17:30896 (R;JP;In Japanese, English)
Reassessment of fuel failure behavior in the SPERT and PBF experiments for irradiated fuel rods under reactivity initiated accident conditions, 17:30953 (R;JP;In Japanese)

FUEL ELEMENTS
See also FUEL PINS
FUEL PLATES
FUEL RODS
SPENT FUEL ELEMENTS
A probabilistic safety assessment of in-pile test loop in HWRR, 17:30887 (R;CN)
Analysis and evaluation of the in-pile irradiation test of the fuel element for Qinshan Nuclear Power Plant, 17:30882 (R;CN;In Chinese)
Ground test facility for SEI nuclear rocket engines, 17:30917 (R;US)
Interactions between drops of molten Al-Li alloys and liquid water, 17:31029 (R;US)
Nondestructive testing of bonding of low enriched uranium elements by using ultrasonic phase-amplitude technique, 17:30952 (R;CN)
The development of computer codes for NPP fuel behavior analysis at IAE, 17:32506 (R;CN;In Chinese)

FUEL PELLETS
A nondestructive testing device for determining ^{235}U enrichment in power reactor fuel elements, 17:30951 (R;CN;In Chinese)

FUEL PENCILS
See FUEL PINS

FUEL PINS
Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code, 17:30910 (R;US)

FUEL PLATES
Fuel plate stability experiments and analysis for the Advanced Neutron Source, 17:30973 (R;US)

FUEL REPROCESSING
See REPROCESSING

FUEL REPROCESSING PLANTS
See also IDAHO CHEMICAL PROCESSING PLANT
Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy, 17:30772 (R;US)

FUEL ROD CONSOLIDATION
See FUEL RODS

FUEL RODS
Inspection of irradiated Mark 18 fuel tubes, 17:30976 (R;US)

FUEL SHEATHS
See FUEL CANS

FUEL SLUGS
See FUEL RODS

FUEL SLURRIES
Rheological properties essential for the atomization of coal water slurries (CWS): Quarterly progress report, March 15, 1992–June 15, 1992, 17:30472 (R;US)
Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)
Technology descriptions and demonstrations, 17:30419 (RA;US)

FUEL SUSPENSIONS
See FUEL SLURRIES

FUEL-COOLANT INTERACTIONS
Characterization of jet breakup mechanisms observed from simulant experiments of molten fuel penetrating coolant: Technical progress report, FY 1992, 17:31005 (R;US)

FUELS (NUCLEAR)
See NUCLEAR FUELS

FUELWOOD
See WOOD FUELS

FULLERENES
Analysis of collective resonances in clusters: Metals and carbon, 17:32367 (R;US)
C_{60} transformations at high pressures, 17:31283 (R;US)

FULVIC ACIDS
HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

FUNCTIONS
See also DISTRIBUTION FUNCTIONS
GREEN FUNCTION
RESPONSE FUNCTIONS
STRENGTH FUNCTIONS
Dynamic multimodal function optimization using genetic algorithms, 17:32567 (R;US)
GENED ENV ROUTINES: Subroutine library, 17:32521 (CM;US)

FUNDAMENTAL PARTICLES
See ELEMENTARY PARTICLES

FUNGI
Integrated control of Sclerotinia sclerotiorum with Benomyl and and Trichoderma harzianum resistant to benzimidazoles, 17:31923 (IA;BR;In Portuguese)

FUSION (BONDING, NONMETALLIC)
See BONDING

FUSION (NUCLEAR)
See THERMONUCLEAR REACTIONS

FUSION (WELDING)
See WELDING

FUSION ENERGY
See THERMONUCLEAR REACTORS

FUSION REACTIONS
See HEAVY ION FUSION REACTIONS

FUSION REACTORS
See THERMONUCLEAR REACTORS

G

G CODES
GENED ENV ROUTINES: Subroutine library, 17:32521 (CM;US)
GRENADE: 3d multigp diffusion Green's function, 17:32529 (CM;RO)

GADOLINIUM
The isolation of lutetium from gadolinium contained in Purex process solutions, 17:30643 (R;US)

GALLIUM ISOTOPES
Distribution of ionic indium and gallium in pregnant and non-pregnant animals, 17:31885 (RA;US)

GAMMA DOSIMETRY
Point-pair distributions for internal dosimetry, 17:31897 (RA;US)

GAMMA RADIATION
Application of a safeguards radiation measurement system to the screening of spent fuel assemblies for transport and storage, 17:30646 (R;US)

SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)

GAMMA REACTIONS
See PHOTONUCLEAR REACTIONS

GAMMA SOURCES
Development of a ^{60}Co radioactive rod source used for γ-ray level gauge, 17:30787 (R;CN;In Chinese)
Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)

GAMMA SPECTROSCOPY
A lossless one-pass sorting algorithm for symmetric three-dimensional gamma-ray data sets, 17:31601 (R;US)

GANIL
See GANIL CYCLOTRON

GANIL CYCLOTRON
A new radiation safety control system for Ganil, 17:31431 (R;FR)
Capacitive beam position monitors and automatic beam centering in the transfer lines of Ganil, 17:31453 (R;FR)
Recent improvements and new possibilities of the Ganil facility, 17:31432 (R;FR)

GARONA REACTOR
Recirculation suction large break LOCA analysis of the Santa Maria De Garona Nuclear Power Plant using TRAC-BF1 (G1J1), 17:31026 (R;US)

GAS COOLANTS
See GASES

GAS ENGINES
See INTERNAL COMBUSTION ENGINES

GAS TRACK DETECTORS
Electrical transparency of grids used in gaseous particle detectors, 17:31571 (RA;SU)

GAS TURBINE ENGINES
Emission of non-combusted hydrocarbons from stationary motors and turbines, 17:31663 (I;DK;In Danish)

GAS WELLS
See NATURAL GAS WELLS

GASEOUS DIFFUSION PLANTS
Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)
Laboratory measurement of miscibility and pressure/temperature relationships of n-C_4F_{10}/CFC-114 mixtures, 17:31319 (R;US)

GASEOUS EFFLUENTS
See GASEOUS WASTES

GASEOUS WASTES
See also EXHAUST GASES
FLUE GAS
Miscellaneous Waste Stream strategy document, 17:30703 (R;US)

GASES
See also AIR
COAL GAS
EXHAUST GASES
SYNTHESIS GAS
VAPORS
A distributed data acquisition and centralized data reduction system for flexible and efficient measurements, 17:31076 (R;US)
Dense-gas dispersion advection-diffusion model, 17:31675 (R;US)
Test results for Supplement A to Production Test IP 358 AC, 17:30989 (R;US)

GASKETS
Expansive-graphite-sandwiched spiral-wound stainless steel gasket applied to manhole sealing joints of nuclear equipment, 17:31267 (R;CN;In Chinese)

GASOHOL
Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)

GASOLINE ENGINES
See INTERNAL COMBUSTION ENGINES

GASTROINTESTINAL TRACT
See also INTESTINES
A new mathematical model of gastrointestinal transit incorporating age- and gender-dependent physiological parameters, 17:31890 (RA;US)
Prediction of radiation dose to the GI tract from analysis of blood and liver time-activity curves, 17:31888 (RA;US)

GEESE
Northwest Montana Libby/Hungry Horse Dams wildlife mitigation Columbian sharp-tailed grouse: Final report, 17:31750 (R;US)

GELS
Determination of the permeability of carbon aerogels by gas flow measurements, 17:31280 (R;US)
Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report, 17:30567 (R;US)

GENERAL CIRCULATION MODELS
[Studies of ocean predictability at decade to century time scales using a global ocean general circulation model in a parallel competing environment]: Progress report, 17:32515 (R;US)

GENERATORS (PULSE)
See PULSE GENERATORS

GENERATORS (STEAM)
See STEAM GENERATORS

GENETIC MAPPING
Human Genome, 1991–1992 program report, 17:31766 (R;US)
Proceedings of the second international chromosome 22 workshop, 17:31767 (R;US)
[Mechanisms of inhibition of viral replication in plants]: Progress report, 17:30797 (R;US)

GENOME MUTATIONS
Evolutionary regularities formation of hierarchic system of genome reliability, 17:31979 (RA;SU;In Russian)

GEOCHEMICAL SURVEYS
Control of radiation hazards in uranium exploration, 17:30612 (IA;CA)

GEOCHEMISTRY
Analysis and evaluation of knowledge base and rule. Part 1.: Geochemical classification and significance of original water relating to geothermal system, 17:30851 (IA;JP;In Japanese)
Boron isotope geochemistry in the terrestrial environment, 17:31715 (IA;IL)
EQ3/6 V7.0: Geochemical modeling of aqueous systems, 17:32525 (CM;US)
EQ3/6 V7.1: Geochemical modeling of aqueous systems, 17:32526 (CM;US)
Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)

GEOCHRONOLOGY
See AGE ESTIMATION

GEOLOGIC DEPOSITS
See also NATURAL GAS DEPOSITS
SALT DEPOSITS
URANIUM DEPOSITS
An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)
Ar-Ar age measurements on clay minerals from the Paleozoic section in southern Israel, 17:31703 (IA;IL)
Current research. Part A, 17:32011 (R;CA)
Diagenesis of Inmar Formation, southern Israel: Stable isotope studies of carbonate minerale, 17:31701 (IA;IL)

GEOLOGIC FORMATIONS
A reevaluation of the lake sediment chronology in the Dead Sea basin based on new ^{230}Th/U dates, 17:31702 (IA;IL)
K-Ar ages of the volcanism, southwestern Syria (the Muvlaat region), 17:31713 (IA;IL)
Sr and Nd isotopic constraints on the evolution of the Har Timna igneous complex, southern Israel, 17:31707 (IA;IL)

GEOLOGIC FRACTURES
Analysis of spatial correlation of hydraulic conductivity data from the Stripa mine, 17:31740 (R;SE)
Cross-verification testing of fracture flow and mass transport codes, 17:31741 (R;SE)
Evaporation measurement in the validation drift - part 2, 17:31739 (R;SE)

Final report on Test 4 - Sealing of natural fine-fracture zone, 17:31738 (R;SE)
Fjaellveden study site. Scope of activities and main results, 17:31735 (R;SE)
Gideaa study site. Scope of activities and main results, 17:31734 (R;SE)
Modelling for the Stripa site characterization and validation drift inflow: prediction of flow through fractured rock, 17:31743 (R;SE)
NAPSAC technical document, 17:31742 (R;SE)
Natural fracture systems studies, 17:30587 (R;US)

GEOLOGIC HISTORY
Climatic changes during the Holocene derived from isotopic data from Speleothems and lake deposits in the Galilee, 17:31712 (IA;IL)

GEOLOGIC MODELS
Study of geothermal resource evaluation by potential water volume method, 17:30834 (IA;JP;In Japanese)

GEOLOGIC STRUCTURES
See also GEOLOGIC FRACTURES
Underground structure and temperature structure of the Aso area obtained from gravity and magnetic analysis, 17:30842 (IA;JP;In Japanese)

GEOLOGIC SURVEYS
Analysis and evaluation of data from the nationwide survey of geothermal exploration, 17:30841 (I;JP;In Japanese)
Current research. Part A, 17:32011 (R;CA)

GEOLOGICAL SURVEYS
See GEOLOGIC SURVEYS

GEOLOGY
See also PETROLEUM GEOLOGY
Annual meeting of the Israel Geological Society, 1989, 17:32013 (I;IL)
Annual meeting of the Israel Geological Society, 1991, 17:32012 (I;IL)

GEOTHERMAL AREAS
See GEOTHERMAL FIELDS

GEOTHERMAL FIELDS
See also PALIMPINON GEOTHERMAL FIELD
Analysis and evaluation of data from the nationwide survey of geothermal exploration, 17:30841 (I;JP;In Japanese)
Comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data, 17:30843 (IA;JP;In Japanese)
Statistical distribution of temperatures and physical properties of geothermal areas in Japan, based on logging and core data of boreholes, 17:30839 (IA;JP;In Japanese)

GEOTHERMAL FLUIDS
Analysis and evaluation of knowledge base and rule. Part 1.: Geochemical classification and significance of original water relating to geothermal system, 17:30851 (IA;JP;In Japanese)

GEOTHERMAL GRADIENTS
Temperature gradient map of the Japanese Islands, 17:30850 (IA;JP;In Japanese)
Underground structure and temperature structure of the Aso area obtained from gravity and magnetic analysis, 17:30842 (IA;JP;In Japanese)

GEOTHERMAL POWER PLANTS
Industrial applications of hot dry rock geothermal energy, 17:30844 (R;US)

GEOTHERMAL REGIONS
See GEOTHERMAL FIELDS

GEOTHERMAL RESOURCES
Basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map 'Niigata', 17:30836 (IA;JP;In Japanese)
Comparison of geothermal potentials of main geothermal areas in Japan, based on borehole temperature data, 17:30843 (IA;JP;In Japanese)
Industrial applications of hot dry rock geothermal energy, 17:30844 (R;US)
Interim report of the results of research and development in Sunshine Project in FY1990.: Researches on the technologies of the geothermal resource evaluation of Japan, 17:30832 (I;JP;In Japanese)
Preparation of geothermal resource map of Japan, 17:30833 (IA;JP;In Japanese)
Prospects for the commercial development of hot dry rock geothermal energy in New Mexico, 17:30838 (R;US)
Status and prospects for hot dry rock (HDR) in the United States, 17:30837 (R;US)
Study of geothermal resource evaluation by potential water volume method, 17:30834 (IA;JP;In Japanese)
Study on collection of resource evaluation bases in the northern Tohoku district (Akita-Koma).: Geological survey of Tashirodake and Tara-Komagadake areas, 17:30835 (IA;JP;In Japanese)
Underground structure and temperature structure of the Aso area obtained from gravity and magnetic analysis, 17:30842 (IA;JP;In Japanese)

GEOTHERMAL WELLS
Stanford Geothermal Program [quarterly technical progress reports, July–September 1990 and October–December 1990], 17:30846 (R;US)
Stanford Geothermal Program [quarterly technical report, April–June 1991; topical report, July 1, 1990–June 30, 1991], 17:30848 (R;US)
Stanford Geothermal Program [quarterly technical report, January–March 1991], 17:30847 (R;US)
Stanford Geothermal Program [quarterly technical report, July–September 1991], 17:30849 (R;US)

GERM CELLS
Simulation and depression of repair in mutagenesis of Drosophila: adaptive response and heavy ion effect, 17:31975 (RA;SU)

GERMAN DEMOCRATIC REPUBLIC
See FEDERAL REPUBLIC OF GERMANY

GERMAN FEDERAL REPUBLIC
See FEDERAL REPUBLIC OF GERMANY

GERMANIUM
Atomistic processes of surface segregation during Si-Ge MBE growth, 17:31268 (R;US)

GERMANIUM 76 TARGET
A pocketful of tin isomers from heavy-ion collisions, 17:32272 (R;US)

GERMANIUM ALLOYS
Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30823 (R;US)

GERMANY
See FEDERAL REPUBLIC OF GERMANY

GERMANY (DEMOCRATIC REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY

GERMANY (FEDERAL REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY

GERMS (MICROORGANISMS)
See MICROORGANISMS

GIANT CELLS
See TUMOR CELLS

GLACIERS
On the world's ice ages and changing environments, 17:30747 (R;FI)
SKB/TVO ice age scenario, 17:30748 (R;FI)

GLASS
See also BOROSILICATE GLASS
PHOSPHATE GLASS
Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991, 17:32479 (R;US)

GLASS INDUSTRY
A process control sensor for the glass industry: Phase 1, Extended development program, 17:31256 (R;US)

GLASS MELTERS
See CERAMIC MELTERS

GLAZING
- Glazed courtyard at Taernan: Thermal performance of the courtyard and surrounding residential buildings. Measurements and calculations, 17:31093 (R;SE)
- The energy balance of sloping glazings: Simple empirical correlations between the energy flow through a triple glass roof and the outdoor climate, 17:30827 (R;SE;In Swedish)

GLIOMAS
- Three-step ^{99m}Tc-biotin immunoscintigraphy in the diagnosis of glioma patients, 17:31816 (RA;US)

GLOBAL CLIMATE CHANGE
- *See* CLIMATIC CHANGE

GLOBAL WARMING
- *See* GREENHOUSE EFFECT

GOBAR GAS
- *See* METHANE

GOLD
- Experiments on resonantly photo-pumped x-ray lasers, 17:31423 (R;US)

GOLD 197 REACTIONS
- Exclusive studies of neutron and charged particle emission in relativistic heavy ion reactions, 17:32290 (IA;DE)
- Experimental considerations to measure thermal photons at RHIC, 17:32288 (IA;DE)
- Fragmentation of gold projectiles: From evaporation to vaporization, 17:32291 (IA;DE)
- Small angle correlations of intermediate mass fragments in reactions Au + Au at E/A = 100, 150, 250 MeV, 17:32292 (IA;DE)
- Subthreshold kaon production in 1 GeV/u Au+Au collision within quantum molecular dynamics, 17:32303 (IA;DE)
- The high-energetic component in pion spectra from Au + Au and Ne + NaF at 1 GeV/u$^+$, 17:32297 (IA;DE)

GOLD 197 TARGET
- An 'in acceptance' comparison of Si + Au data and RQMD predictions, 17:32286 (IA;DE)
- FOrPI studies of Au on Au collisions at SIS energies, 17:32289 (IA;DE)

GOLD IONS
- Impact of slow gold clusters on various solids: Non linear effects in secondary ion emission, 17:32377 (R;FR)

GRAIN ALCOHOL
- *See* ETHANOL

GRAIN BOUNDARIES
- Characteristic of the flux pinning at intergrain boundaries in bulk Bi-Pb-Sr-Ca-Cu-O superconductors, 17:32385 (R;CN)

GRAIN ORIENTATION
- Determination of a crystalline orientation distribution function based on inverted poles figures principle for hexagonal crystalline symmetry. Macroscopic physical properties prediction, 17:31206 (R;FR;In French)

GRAINS (CEREAL)
- *See* CEREALS
  SEEDS

GRANITES
- Characterization of the structure and geometry of the H fracture zone at the SCV site, 17:31745 (R;SE)
- The radionuclide migration experiment - overview of investigations 1985 - 1990: Grimsel test site, 17:31729 (R;CH)

GRANULAR MATERIALS
- A theoretical and numerical study of the flow of granular materials, 17:30529 (RA;US)
- Computational modeling of granular flow dynamics: Clustering instability in granular gases, 17:30526 (RA;US)
- Dense transport and fluidization of solids using kinetic theory, 17:30530 (RA;US)
- Experimental apparatus for the study of flowing granular materials, 17:30518 (RA;US)
- Fluidization of particles in horizontal slurry flow, 17:30520 (RA;US)
- Granular flows down bumpy inclines, 17:30528 (RA;US)
- Methodology of a radiosonde system for the non-intrusive tracking of a particle in a flow, 17:30523 (RA;US)
- Multiphase flow studies by NMR with application to granular flows, 17:30519 (RA;US)
- Numerical simulation of inclined chute flows of monodisperse, inelastic, frictional spheres, 17:30531 (RA;US)
- On development of a three-dimensional particle motion tracking system, 17:30534 (R;US)
- Rapid granular shear flows driven by identical, bumpy, frictionless boundaries, 17:30525 (RA;US)
- Statistical mechanical theory of inelastic granular systems, 17:30527 (RA;US)
- Studies of granular flow down an inclined chute: Quarterly technical progress report, March 13, 1992–June 12, 1992, 17:30535 (R;US)

GRANULOCYTES
- *See* LEUKOCYTES

GRAPHITE
- Expansive-graphite-sandwiched spiral-wound stainless steel gasket applied to manhole sealing joints of nuclear equipment, 17:31267 (R;CN;In Chinese)

GRAPHITE MODERATOR
- *See* GRAPHITE

GRAVITATIONAL WAVE DETECTORS
- A data simulation program for the VIRGO detector, 17:31585 (R;FR)

GRAVITY SURVEYS
- Compilation of a gravity map on 1/500,000 Niigata sheet, 17:32009 (IA;JP;In Japanese)

GREAT BRITAIN
- *See* UNITED KINGDOM

GREEN FUNCTION
- Green function and scattering amplitudes in many dimensional space, 17:32029 (R;FR)

GREENHOUSE EFFECT
- Minutes of Japan-US energy conference/Maui Meeting, 17:31052 (R;JP;In Japanese)

GREENLAND
- Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)

GROSS-NEVEU MODEL
- *See* LAGRANGIAN FIELD THEORY

GROSSWELZHEIM HDR REACTOR
- *See* HDR REACTOR

GROUND STATES
- Perturbative ground state energy of three anyons in a harmonic potential, 17:32100 (R;FR)

GROUND WATER
- **Chemical Composition**
  - Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)
  - Selenium speciation in ground water: Quarterly report, 17:31753 (R;US)
- **Chemistry**
  - Ground water chemistry and water-rock interaction at Olkiluoto, 17:30752 (R;FI)
- **Complexes**
  - HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)
- **Contamination**
  - Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)
- **Decontamination**
  - Preliminary feasibility and cost analysis of the in-situ microbial filter concept, 17:30734 (R;US)
- **Flow Models**
  - An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)
- **Fluid Flow**
  - Independent verification and benchmark testing of the UNSAT-H computer code, Version 2.0, 17:31697 (R;US)
  - Independent verification and validation testing of the FLASH computer code, Versiion 3.0, 17:31698 (R;US)

Numerical calculations on heterogeneity of groundwater flow, 17:31759 (R;SE)

Total System Performance Assessment Code (TOSPAC): Volume 2, User's guide: Yucca Mountain Site Characterization Project, 17:30717 (R;US)

Fulvic Acids

HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

Geochemistry

Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)

Humic Acids

HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

Hydrology

Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)

Monitoring

Grout treatment facility dangerous waste permit application: Revision 2: Volume 4, 17:30673 (R;US)

Site characterization and validation - monitoring of head in the Stripa mine during 1991, 17:31737 (R;SE)

Work plan for the preliminary assessment and characterization of dense nonaqueous-phase liquids in the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Oak Ridge Y-12 Plant, 17:30745 (R;US)

Radionuclide Migration

Concentrations of particulate matter and humic substances in deep groundwaters and estimated effects on the adsorption and transport of radionuclides, 17:31755 (R;SE)

DISPERS: Mathematical models for dispersion of radionuclides, 17:32547 (CM;US)

DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)

Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992, 17:32000 (R;US)

TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project, 17:30719 (R;US)

Remedial Action

Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)

Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117, 17:30753 (R;US)

Three-dimensional bioremediation modeling in heterogeneous porous media, 17:31728 (R;US)

Seismic Effects

An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)

Earthquake-induced water-level fluctuations at Yucca Mountain, Nevada, April 1992, 17:31747 (R;US)

Water Quality

Technical summary of groundwater quality protection program at the Savannah River Site (1952–1986): Volume 2, Groundwater monitoring results, 17:31696 (R;US)

GROUND-WATER RESERVES

See AQUIFERS

GROUTING

Final report of the rock sealing project - Sealing properties and longevity of smectitic clay grouts, 17:30733 (R;SE)

GROWTH (CRYSTAL)

See CRYSTAL GROWTH

GROWTH FACTORS

Coupling of ^{125}I-EGF to serum albumin to stabilize the radioiodine bond: Radiolabeling, purification by HPLC, stability and biodistribution in mice, 17:31829 (RA;US)

GROWTH HORMONE-RELEASE INHIBITING FACTOR

See SOMATOSTATIN

GUNDREMMINGER KRB REACTOR

See RWE-BAYERNWERK REACTOR

H

HADRON-HADRON INTERACTIONS

Hadron nucleon interactions in view of a multi-peripheral model, 17:32157 (R;XA)

Hadronic interactions at intermediate energies: Progress report, November 1987, 17:32155 (R;US)

HADRONS

See also BARYONS
MESONS

Energy division and hadron transverse momenta in the quark-gluon strings model, 17:32111 (R;SU)

Hadronization of highly virtual quarks in nuclei, 17:32233 (R;SU)

Some new aspects of the unitary and analytic VMD model for electromagnetic structure of hadrons, 17:32195 (R;SU)

HAFNIUM ISOTOPES

Methods reducing doppler broadening in laserspectroscopy of stored ions and the isotope shifts of hafnium, 17:32356 (R;DE;In German)

HAIR

Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32, 17:31993 (RA;US)

HALDEN HEAVY BOILING WATER REACTOR

See HBWR REACTOR

HALL GENERATORS

See MHD GENERATORS

HANDLING (DATA)

See DATA PROCESSING

HANDLING (MATERIALS)

See MATERIALS HANDLING

HANDLING (WASTES)

See WASTE MANAGEMENT

HANFORD ATOMIC PRODUCTS OPERATION

See HAPO

HANFORD ENGINEERING DEVELOPMENT LABORATORY

1992 Report on Hanford Site land disposal restrictions for mixed wastes, 17:30779 (R;US)

200 Areas operation monthly report, August 1968, 17:30650 (R;US)

Hanford Federal Facility Agreement and Consent Order, quarterly progress report, March 31, 1992, 17:30674 (R;US)

Hanford radiological protection support services annual report for 1991, 17:31994 (R;US)

HANFORD PRODUCTION REACTORS

Chemical decontamination of Hanford production reactors, 17:30990 (R;US)

Hanford Atomic Products Operation monthly report, July 1955, 17:30985 (R;US)

Hanford Atomic Products Operation monthly report, October 1955, 17:30987 (R;US)

Interim report - Production Test MR-105-12 crossheader purge with chromic acid, 17:30986 (R;US)

Preliminary investigation of water coagulation characteristics as affects reactor effluent radionuclides, 17:30967 (R;US)

Reactor Operations daily reports, July 1, 1968–August 31, 1968: Rough draft, 17:30981 (R;US)

Reactor operations daily reports, July 1, 1967–June 30, 1968, 17:30980 (R;US)

Test results for Supplement A to Production Test IP 358 AC, 17:30989 (R;US)

HANFORD RESERVATION

An evaluation of Hanford water treatment practices addendum, 17:30969 (R;US)

Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)

Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3, 17:30676 (R;US)

Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5, 17:30677 (R;US)
Draft environmental assessment for characterization of the Hanford Site pursuant to the Nuclear Waste Policy Act of 1982 (Public Law 97-425), Hanford Site, Richland, Benton County, Washington, 17:30660 (R;US)
Environment, Safety and Health Progress Assessment of the Hanford Site, 17:31051 (R;US)
Experience with NQA-1 quality assurance standards applied to in vitro bioassay, 17:31990 (RA;US)
H.I. report on the 200 Areas and associated laboratories for the week ending August 27, 1947, 17:30755 (R;US)
Hanford Atomic Products Operation monthly report, July 1955, 17:30985 (R;US)
Hanford Atomic Products Operation monthly report, October 1955, 17:30987 (R;US)
Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992, 17:32000 (R;US)
Hanford Federal Facility Agreement and Consent Order, quarterly progress report, March 31, 1992, 17:30674 (R;US)
Public involvement in the Hanford Double-Shell Tank waste disposal program, 17:30712 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)

HAPO
200 Areas operation monthly report, October 1967, 17:30636 (R;US)
200 Areas operation monthly report, September 1967, 17:30635 (R;US)

HARD X RADIATION
Hard X-ray measurement on HT-6B tokamak, 17:32400 (R;CN;In Chinese)

HARMONIC POTENTIAL
Potential harmonic calculations of the binding energies of bosons and fermions in nuclear physics, 17:32193 (R;FR)

HAZARDOUS MATERIALS
See also TOXIC MATERIALS
A Remote Characterization System for subsurface mapping of buried waste sites, 17:30715 (R;US)
A system for destroying mixed and hazardous wastes with no gas or liquid effluents, 17:30737 (R;US)
Approach and strategy for performing ecological risk assessments for the Department of Energy Oak Ridge Field Office Environmental Restoration Program: Environmental Restoration Program, 17:31699 (R;US)
Cost performance assessment of in situ vitrification, 17:30706 (R;US)
Development of robotics technology for remote characterization and remediationof buried waste, 17:31353 (R;US)
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)
The role of cellular and molecular studies in evaluation of health effects from combined radiation and chemical exposures, 17:31997 (R;US)
Work plan for the preliminary assessment and characterization of dense nonaqueous-phase liquids in the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Oak Ridge Y-12 Plant, 17:30745 (R;US)

HBWR REACTOR
Institutt for Energiteknikk - Annual report 1991, 17:32493 (I;NO)

HD 8077
See NICKEL BASE ALLOYS

HDO
See HEAVY WATER

HDR REACTOR
Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility), 17:30993 (R;US)

HE-3 COUNTERS
Characterization of ^{3}He area sensitive proportional counters at IPNS for SANS applications, 17:31539 (R;US)

HEAD END PROCESSES
Conceptual design of fixed bed burning system: A study of the head-end process for Th-U nuclear fuel cycle in HTGR, 17:30639 (R;CN;In Chinese)

HEALTH HAZARDS
Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)

HEALTH PHYSICS
See RADIATION PROTECTION

HEART
See also MYOCARDIUM
An approach to cellular level dosimetry using compartmental model analysis and dynamic PET, 17:31901 (RA;US)
Mitochondrial and sarcolemmal membrane potentials determine accumulation of the R and S stereoisomers of the technetium isonitrile complex $Tc(CNCH(CH_2CH_3)CH_2OCH_3)_6^+$, 17:31822 (RA;US)
Radiopharmacological studies of ^{99m}Tc-CPI: Experience with isolated rat atrial tissue, 17:31823 (RA;US)
Radiopharmacological studies of a new functionalized isonitrile technetium complex: $[Tc(2\text{-ethoxy-2-methylpropylisonitrile})_6]^+$, 17:31824 (RA;US)

HEAT CAPACITY
See SPECIFIC HEAT

HEAT EXCHANGERS
See also DIRECT CONTACT HEAT EXCHANGERS
FLUIDIZED BED HEAT EXCHANGERS
Aging of non-power-cycle heat exchangers used in nuclear power plants: Operating experience and failure identification: Volume 1, 17:30877 (R;US)
An overview of heat exchanger enhancement techniques for industrial applications, 17:31142 (R;US)
Experimental evaluation of different parameters importance for the frosting process between plates, 17:31399 (RA;SE;In Swedish)
Proceedings of the DOE/Advanced Heat Exchangers Program Review: Summary report, 17:31095 (R;US)
Theoretical and experimental studies of frost between two plates, 17:31396 (R;SE;In Swedish)
Two-phase flow modeling with discrete particles, 17:31129 (R;US)

HEAT RESISTING ALLOYS
See also ALLOY-ZR98SN-4
STEEL-CR17NI12MO3-L
STEEL-CR18NI10TI
STEEL-CR19NI10
Investigation of hydrogen permeability of protective coating for high-temperature alloy EI698, 17:31232 (R;SU;In Russian)
The nature of scales grown on binary Cr-Nb alloys, 17:31219 (R;US)

HEAT TRANSFER
See also CONVECTION
An improved numerical model for the investigation of thermal hydraulic phenomena with applications to LMR reactor components, 17:30911 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 2, 17:30932 (R;US)
Experiences with numerical fluid flow and heat transfer calculations on multiprocessor computers: Lecture given at the Symposium on Chemical Engineering of the Finnish Chemical Congress in Helsinki, on November 9, 1989, 17:31374 (R;FI)
Heat transfer in a liquid metal crucible with an integral blackbody cavity, 17:31402 (R;US)
Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code, 17:30910 (R;US)
Numerical fluid flow and heat transfer calculations on multiprocessor systems, 17:31371 (R;FI)
TRAC-BF1/MOD1 models and correlations, 17:31021 (R;US)

HEAT TRANSMISSION
See HEAT TRANSFER

HEATING LOAD
General computer programme for the calculation of areas of shadow on level surfaces (Shadows on windows), 17:31100 (R;DK;In Danish)

HEATING SYSTEMS
See also SOLAR HEATING SYSTEMS
Heat measurements in fluid systems, 17:31094 (R;SE;In Swedish)
Heating and cooling with low-temperature water: Prerequisities, experiences, possibilities, 17:31145 (R;SE;In Swedish)
SAS Froesundavik. An office heated and cooled by groundwater, 17:31092 (R;SE)

HEAVY ION FUSION REACTIONS
Mechanism of enhanced yield of light particles in compound nucleus formation: diffusion description, 17:32328 (R;SU)
Resonance amplification of the nuclear reaction X(a,b)Y near the a+X channel threshold, 17:32327 (R;SU)

HEAVY ION REACTIONS
See also GOLD 197 REACTIONS
LITHIUM 7 REACTIONS
SILICON 28 REACTIONS
SULFUR 32 REACTIONS
Collisions in an expanding pion gas and the pperpendicular to spectrum in ultrarelativistic heavy ion collisions, 17:32301 (IA;DE)
Double differential neutron and proton productions cross sections in nucleus-nucleus collisions, 17:32335 (R;SU;In Russian)
Experimental challenges at RHIC and LHC, 17:32278 (R;US)
Finite positive pion chemical potential and lepton pair production in heavy ion collisions, 17:32300 (IA;DE)
Giant resonances and multiphonons states in heavy ion reactions, 17:32316 (R;FR)
Gross properties of nuclei and nuclear excitations. Proceedings, 17:32285 (I;DE)
Hadronic sources of dileptons from heavy ion collisions at intermediate and relativistic energies, 17:32299 (IA;DE)
Medium dependent pion-production in heavy-ion collisions within the quantum molecular dynamics, 17:32307 (IA;DE)
Onset of multifragmentation in medium energy heavy ion collisions, 17:32302 (IA;DE)
Orbiting: toward a unified model of nucleus-nucleus collision or excitation of nuclear molecular states in heavy ion collisions?, 17:32276 (R;US)
Particle production at SIS energies and the nuclear equation of state, 17:32296 (IA;DE)
Relativistic BUU-approach with momentum-dependent mean-fields, 17:32306 (IA;DE)
Relativistic mean-field three-fluid model for intermediate-energy heavy-ion collisions. Simulation of kinetic results, 17:32304 (IA;DE)
Relativistic quantum hadron molecular dynamics (RQHMD) for heavy collisions, 17:32305 (IA;DE)
Thermal properties and medium effects in the study of heavy-ion collisions with realistic NN interactions, 17:32294 (IA;DE)

HEAVY IONS
Investigation of very neutron rich isotopes towards ^{78}Ni: why and how, 17:32228 (R;FR)

HEAVY NUCLEI
See also IRIDIUM 181
LEAD 210
MERCURY 192
POLONIUM 218
RADON 220
RADON 222
The isoscalar 4$^-$ and 5$^-$ giant resonances in spherical nuclei, 17:32236 (R;SU;In Russian)

HEAVY OILS
See PETROLEUM
VISCOSITY

HEAVY WATER
Observation of fast neutrons and tritium during electrolysis of heavy water, 17:32427 (R;SU)

HEAVY WATER COOLANT
See HEAVY WATER

HEAVY WATER MODERATOR
See HEAVY WATER

HEISSDAMPFREAKTORANLAGE
See HDR REACTOR

HELAC
See LINEAR ACCELERATORS

HELIUM
Fluid dynamics of supercritical helium within cable-in-conduit conductors: Progress report, 17:32393 (R;US)

HELIUM 3 TARGET
Compression of polarized ^{3}He, 17:31487 (RA;FR)
Two-nucleon production of hyperons in an S = −1 dibaryon search, 17:32274 (R;US)

HELIUM 4
The integrodifferential equation approach compared with Shell Model calculations on the ^{4}He nucleus, 17:32231 (R;FR)

HETEROPOLYANIONS
Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)
Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of Ru$_3$(CO)$_{12}$ (or RuCl$_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)

HF RADIATION
See SHORT WAVE RADIATION

HFETR REACTOR
Irradiation surveillant test of High Flux Engineering Test Reactor (HFETR) pressure vessel, 17:30972 (R;CN;In Chinese)

HFR REACTOR
Neutron metrology in the HFR: Neutron and gamma metrology in the free beam of HB 11, 17:31550 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-416, 17:30982 (R;NL)
Neutron metrology in the HFR: Steel irradiation in the HFR R139-656, 17:30983 (R;NL)

HIGGS BOSONS
Calculation of the Higgs boson decay widths into boson pairs, 17:32146 (R;SU;In Russian)
Detection of charged Higgs bosons through the rare decay H$^+$ → W$^+\gamma$, 17:32190 (R;XA)
H$^+$H$^-$ interaction up to higher orders of perturbation theory in the model with two Higgs doublets (self-energy and vertex diagrams), 17:32194 (R;SU)
Higgs production in a photon-photon collider, 17:32171 (R;FR)
Higgsometry from Ultimate LEP, 17:32200 (R;FR)
Searches for new particles at LEP, 17:32197 (R;FR)
Testing the neutral Higgs sector of the M.S.S.M. with a 300-500 GeV e$^+$e$^-$ collider, 17:32147 (R;FR)

HIGGS MODEL
H$^+$H$^-$ interaction up to higher orders of perturbation theory in the model with two Higgs doublets (Lagrangian and one-loop amplitudes), 17:32142 (R;SU)

HIGH ENERGY PHYSICS
Experimental Medium Energy Physics: Annual progress report, June 1991–May 1992, 17:32067 (R;US)
Indiana University High Energy Physics Group, Task C: Technical progress report, January 1, 1992–October 31, 1992, 17:32069 (R;US)

HIGH EXPLOSIVES
See CHEMICAL EXPLOSIVES

HIGH FLUX NEUTRON SOURCE FACILITY
See NEUTRON SOURCE FACILITIES

HIGH FLUX REACTOR PETTEN
See HFR REACTOR

HIGH FREQUENCY RADIATION
See SHORT WAVE RADIATION

HIGH SPIN STATES
Nuclear superdeformation at high spins, 17:32215 (R;FR)

HIGH TEMPERATURE GAS COOLED AND GRAPHITE MODERATED REACTORS
See HTGR TYPE REACTORS

HIGH-LEVEL RADIOACTIVE WASTES
  Asse Salt Mine
    Progress report of the ECN contribution to the experiments in the HAW project: 1st half year 1991, 17:30681 (R;NL)
  Computerized Tomography
    Quality assurance of radioactive waste packages by computerized tomography, 17:30692 (R;FR)
  Decay
    Characteristics of potential repository wastes: Volume 3, Appendix 3A, ORIGEN2 decay tables for immobilized high-level waste; Appendix 3B, Interim high-level waste forms, 17:31332 (R;US)
  Electrodialysis
    Electrodialysis and electrohydrolysis applied to Hanford single tank wastes, 17:30736 (R;US)
  Hydrolysis
    Electrodialysis and electrohydrolysis applied to Hanford single tank wastes, 17:30736 (R;US)
  Meetings
    Proceedings from the technical workshop on near-field performance assessment for high-level waste, 17:30723 (R;SE)
  Quality Assurance
    Quality assurance of radioactive waste packages by computerized tomography, 17:30692 (R;FR)
  Radioactive Waste Disposal
    Integrated near-field assessment, 17:30730 (RA;SE)
    Performance assessment perspectives with reference to the proposed repository at Yucca Mountain, Nevada, 17:30724 (RA;SE)
    Proceedings from the technical workshop on near-field performance assessment for high-level waste, 17:30723 (R;SE)
    Source term models for the release of radionuclides from used nuclear fuel, 17:30726 (RA;SE)
    What do we know about nuclear waste glass performance in the repository near field?, 17:30725 (RA;SE)
  Radioactive Waste Processing
    Independent technical review of Savannah River Site Defense Waste Processing Facility technical issues, 17:30662 (R;US)
  Radiochemical Analysis
    Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)
  Radionuclide Migration
    Near field transport processes, 17:30728 (RA;SE)
  Stability
    Phase stability determinations of DWPF waste glasses, 17:30743 (R;US)
  Underground Disposal
    Draft environmental assessment for characterization of the Hanford Site pursuant to the Nuclear Waste Policy Act of 1982 (Public Law 97-425), Hanford Site, Richland, Benton County, Washington, 17:30660 (R;US)
    Introduction to transitional events workshop, 17:30652 (RA;CA)
    TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project, 17:30719 (R;US)
    Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project, 17:30669 (R;US)
    Total System Performance Assessment Code (TOSPAC): Volume 2, User's guide: Yucca Mountain Site Characterization Project, 17:30717 (R;US)
    Yucca Mountain Site Characterization Project Technical Data Catalog: Yucca Mountain Site Characterization Project, 17:30668 (R;US)
  Waste Forms
    Phase stability determinations of DWPF waste glasses, 17:30743 (R;US)
HIGH-PURITY GE DETECTORS
  New capabilities for measurement of natural radioactivity using high purity N-type germanium detectors, 17:31565 (IA;CA)
HIGH-TC SUPERCONDUCTORS
  Bipolaronic charge density waves, polaronic spin density waves and high $T_c$superconductivity, 17:32390 (R;US)
  Electrical and microstructural characterization of silver sheathed high T_c superconductors wires and ribbons, 17:31249 (R;FR)
  Frustrated phase separation and high temperature superconductivity, 17:31248 (R;US)
  High-temperature deformation and diffusion in oxides, 17:31245 (R;US)
  Intermetallic superconductors - The state of development in 1991, 17:32382 (RA;US)
  Landau level quantization and superconductivity, 17:32381 (R;US)
  National laboratories and CRADAs: Summary, 17:31060 (R;US)
  Neutron scattering studies of the spin dynamics in $La_{2-x}Sr_xO_4$, 17:32387 (R;US)
  Oxygen diffusion in high-$T_c$superconductors, 17:31246 (R;US)
  YBCO based multilayers for optoelectronic devices, 17:31251 (R;FR)
HILBERT SPACE
  A remark on the unitary part of contractions, 17:32075 (R;XA)
  Differential inclusions governed by convex and nonconvex perturbation of a sweeping process, 17:32021 (R;XA)
  Nth roots of normal contractions, 17:32082 (R;XA)
HOG FUEL
  See WOOD WASTES
HOLOGRAPHY
  Ultra wide band 3-D cross section (RCS) holography, 17:31625 (R;US)
HOMOGENEOUS PLASMA
  The electrostatic wake of a superthermal test electron in a magnetized plasma, 17:32420 (R;US)
HORIZONTAL AXIS TURBINES
  Investigation of an electrical converter system with an induction generator for variable speed operation of a wind turbine, 17:30860 (R;SE)
HORMONES
  Production of biological reagents for radioimmunoassay second antibody, 17:31853 (R;BR;In Portuguese)
HOT PLASMA
  Observation of spatial resolution of ECR plasma on the MM-2 magnetic mirror, 17:32401 (R;CN;In Chinese)
HOT SPRINGS
  Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)
HOT WATER HEATERS
  See WATER HEATERS
HOUSEHOLDS
  Residential electricity consumption, 17:31118 (R;FI;In Finnish)
  The energy contents of products and the indirect energy consumption of households, 17:31089 (R;FI;In Finnish)
HOUSES
  Measurement and calculations of the solar radiation through glass areas, taking into consideration the objects shadowing the low energy house G in Hjortekaer, 17:31099 (R;DK;In Danish)
  Radioecological aspects of former mining activities in the Saxon Erzgebirge, 17:31716 (IA;AT)
  Solar building study. Final report: Spinney Gardens [Crystal Palace, London], 17:30826 (R;GB)
HT-6B TOKAMAK
  Characteristics of low-q discharge on HT-6B tokamak, 17:32399 (R;CN;In Chinese)
  Hard X-ray measurement on HT-6B tokamak, 17:32400 (R;CN;In Chinese)
HTGR PEACH BOTTOM REACTOR
  See PEACH BOTTOM-1 REACTOR
HTGR TYPE REACTORS
  See also PEACH BOTTOM-1 REACTOR
    VRAIN REACTOR
  Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)
  Evaluation of MHTGR fuel reliability, 17:30904 (R;US)
  Impact of increasing MHTGR power on passive heat removal, 17:30903 (R;US)

Non-isotropic thermal behavior of an MHTGR fuel block: Impact upon reactivity feedback, 17:30901 (R;US)
Safety aspects of forced flow cooldown transients in modular high temperature gas-cooled reactors, 17:31002 (R;US)
The model and optimization of HTGR nuclear fuel cycle: Pt. 1: Mono-reactor model, 17:30923 (R;CN;In Chinese)
The model and optimization of HTGR nuclear fuel cycle: Pt. 2: Multi-reactor model, 17:30922 (R;CN;In Chinese)

HTO
See HEAVY WATER

HUGENHOLTZ-PINES THEORY
See HYDROGEN

HUMAN CELLS
See ANIMAL CELLS

HUMAN CHROMOSOME 22
Proceedings of the second international chromosome 22 workshop, 17:31767 (R;US)

HUMAN CHROMOSOMES
See also HUMAN CHROMOSOME 22
Human Genome, 1991–1992 program report, 17:31766 (R;US)

HUMAN POPULATIONS
Energy and Technology Review, April–May 1992, 17:31768 (R;US)
Hanford Environmental Dose Reconstruction Project: Monthly report, June 1992, 17:32000 (R;US)
Media information review, January–June 1992: Hanford Environmental Dose Reconstruction Project, 17:32001 (R;US)
Summary of the March 25–26, 1991 atmospheric model working meeting: Hanford Environmental Dose Reconstruction Project, 17:31999 (R;US)
The assessment of risks from exposure to low-levels of ionizing radiation, 17:31995 (R;US)

HUMANS
See HUMAN POPULATIONS

HUMIC ACIDS
HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

HUMUS
Metal concentrations of the mor layer, 17:31736 (R;SE)

HYBRID ELECTRIC-POWERED VEHICLES
Single-shaft electric propulsion system technology development program – ETX-II: Final technical report, 17:31186 (R;US)

HYDRAULIC CONDUCTIVITY
Numerical calculations on heterogeneity of groundwater flow, 17:31759 (R;SE)
The radionuclide migration experiment - overview of investigations 1985 - 1990: Grimsel test site, 17:31729 (R;CH)

HYDRAULIC RAMS
See PUMPS

HYDRAULICS
Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code, 17:30910 (R;US)
TRAC-BF1/MOD1 models and correlations, 17:31021 (R;US)

HYDROCARBONS
See also BENZENE
TOLUENE
Motor vehicle fuel economy, the forgotten HC control stragegy?, 17:31187 (R;US)
Utilizing asphaltene pyrolysis to predict pyrolysis kinetics of heavy crude oil and extractable native bitumen, 17:30603 (R;US)

HYDROCHLORIC ACID
MCFC diagnostics: HCl detection, 17:31079 (R;US)

HYDRODYNAMICS
See also MAGNETOHYDRODYNAMICS
Applications of group-invariant analytic solutions to inertial confinement fusion, 17:32464 (R;US)
Construction of large-scale simulation codes using ALPAL: Generation of a hydrodynamics code module, 17:32565 (R;US)

HYDROELECTRIC POWER PLANTS
Divestiture summary report: Sale of Eklutna and Snettisham hydroelectric projects, 17:30816 (R;US)

HYDROGEN
Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)
Oxidation-sulfidation behavior of iron alloys containing 16 to 40 atomic percent aluminum, 17:31216 (R;US)
Summary of the 12th study meeting of hydrogen energy system, 17:30794 (I;JP;In Japanese)

HYDROGEN 1 MINUS BEAMS
First results on D- production in the joint CEA-JAERI experiment at Cadarache, 17:32444 (R;FR)

HYDROGEN 1 TARGET
A possible interpretation of anomalous behaviour of proton spectrum at 0 deg from deuteron fragmentation at 9 GeV/c, 17:32330 (RA;SU;In Russian)
Charge-exchange cross sections of the ^{3}H→^{3}He reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)

HYDROGEN 3
See TRITIUM

HYDROGEN CHLORIDES
See HYDROCHLORIC ACID

HYDROGEN FUELS
Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)
Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)
Liquid hydrogen flow problems in Kiwi reactors, 17:30915 (R;US)

HYDROGEN HYDROXIDES
See WATER

HYDROGEN MINUS 1 BEAMS
See HYDROGEN 1 MINUS BEAMS

HYDROGEN PEROXIDE
Spectrophotometric determination of hydrogen peroxide in the presence of fluoride, 17:31309 (R;US)

HYDROGEN PRODUCTION
Program of research and development on the production of hydrogen from water: Annual progress report 1990, 17:30795 (R;SE)
Reformers for the production of hydrogen from methanol and alternative fuels for fuel cell powered vehicles, 17:31188 (R;US)

HYDROGEN STORAGE
Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)

HYDROGEN SULFIDES
Biological conversion of synthesis gas: Project status report, January 1, 1992–March 31, 1992, 17:30436 (R;US)
Oxidation-sulfidation behavior of iron alloys containing 16 to 40 atomic percent aluminum, 17:31216 (R;US)

HYDROLOGY
Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)

HYDRORETORTING PROCESS
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 1, Task 1, PFH scoping studies and Task 2, PFH optimization studies: Final report, September 1987–May 1991, 17:30599 (R;US)
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991, 17:30600 (R;US)

HYLIFE CONVERTER
A vacuum disengager for tritium removal from HYLIFE-II Reactor Flibe, 17:32457 (R;US)
HYLIFE-2 progress report, 17:32471 (R;US)

HYPERCUBE COMPUTERS
Performance of a plasma fluid code on the Intel parallel computers, 17:32405 (R;US)

HYPERFRAGMENTS
See HYPERNUCLEI

HYPERNUCLEI
Lambda attachment in fission: a probe of the necking dynamics, 17:32319 (R;FR)

HYPERONS
See also LAMBDA BARYONS
Spin observables in the pp→pK$^+$Y reactions at Saturne, 17:32154 (R;FR)
Two-nucleon production of hyperons in an S = −1 dibaryon search, 17:32274 (R;US)

HYPOIODOUS ACID
Measurement on the rate of some reactions relevant to iodine chemistry in the aqueous phase, 17:31327 (RA;JP)

I

I CODES
IRDAM: Interactive rapid dose assessment model, 17:32544 (CM;US)
ICF DEVICES
Inertial confinement fusion driver enhancements: Final focusing systems and compact heavy-ion driver designs, 17:32472 (R;US)
ICRP
Patients protection during diagnosis and therapy with ionizing radiation: ICRO recommendations, 17:31929 (RA;IL;In Hebrew)
IDAHO CHEMICAL PROCESSING PLANT
Calciner Pilot Plant waste minimization practices at the ICPP, 17:30742 (R;US)
ICPP custom dissolver explosion recovery, 17:30763 (R;US)
IDAHO NATIONAL ENGINEERING LABORATORY
Idaho National Engineering Laboratory response to the December 13, 1991, Congressional inquiry on offsite release of hazardous and solid waste containing radioactive materials from Department of Energy facilities, 17:30663 (R;US)
Risk assessment technique for evaluating research laboratories, 17:32007 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)
Waste management in an environmental chemistry laboratory, 17:30686 (R;US)
IGNITION SYSTEMS
Hot-wire vs laser, is there a difference?, 17:31633 (R;US)
ILLINOIS
Research on improved and enhanced oil recovery in Illinois through reservoir characterization, March 28, 1992–June 28, 1992, 17:30566 (R;US)
IMAGE INTENSIFIERS
High frame-rate, large field wavefront sensor, 17:32064 (R;US)
IMMUNOGLOBULINS
Production of biological reagents for radioimmunoassay second antibody, 17:31853 (R;BR;In Portuguese)
IMPACT TESTS
Development of a 1000 g, 10 ms mechanical shock test capability: Final report, 17:31405 (R;US)
IMPERFECTIONS
See DEFECTS
IN PILE LOOPS
A probabilistic safety assessment of in-pile test loop in HWRR, 17:30887 (R;CN)
IN-SERVICE INSPECTION
Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991, 17:31022 (R;US)
Recommendations on frequently encountered relief requests, 17:30942 (R;US)
INCIDENTS
See ACCIDENTS
INCINERATION
See COMBUSTION
INCINERATORS
NO$_x$ reducing measures at five Swedish waste incineration plants, 17:30868 (R;SE;In Swedish)
INCOLOY 825
Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
INDIUM ISOTOPES
Distribution of ionic indium and gallium in pregnant and nonpregnant animals, 17:31885 (RA;US)
INDOOR AIR POLLUTION
Demand controlled ventilating systems: Sensor market survey, 17:31091 (R;SE)
INDUSTRIAL PLANTS
See also BIOMASS CONVERSION PLANTS
Derived annual estimates of manufacturing energy consumption, 1974–1988, 17:31075 (R;US)
INDUSTRIAL RADIOGRAPHY
Industrial radiography, 17:30791 (R;IL;In Hebrew)
INDUSTRIAL SECTOR
See INDUSTRY
INDUSTRY
See also GLASS INDUSTRY
METAL INDUSTRY
NATURAL GAS INDUSTRY
NUCLEAR INDUSTRY
PETROLEUM INDUSTRY
National laboratories and CRADAs: Summary, 17:31060 (R;US)
The analysis of the energy consumption of an industrial building and development of the monitoring, 17:31137 (R;FI;In Finnish)
Trend in energy demand in factory air conditioning.: Analysis by a questionnaire of actual situation of air conditioning for cooling, 17:31130 (R;JP;In Japanese)
INERTIAL CONFINEMENT
Applications of group-invariant analytic solutions to inertial confinement fusion, 17:32464 (R;US)
ICF related experiments at CEL-V, 17:32439 (R;FR)
INERTIAL CONFINEMENT FUSION DEVICES
See ICF DEVICES
INFLAMMATION
Targeting of macrophages for the scintigraphic evaluation of inflammatory lesions in a model of radio-induced inflammation in pigs, 17:31769 (R;FR)
INFLATIONARY UNIVERSE
General scalar-tensor theories for induced gravity inflation, 17:32081 (R;XA)
INFORMATION
1992 DOE Defense Critical Technologies Plan, 17:31193 (R;US)
Analysis and evaluation of information network system, 17:32573 (IA;JP;In Japanese)
Data Base Management Plan for the remedial investigation of Waste Area Grouping 5 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:32576 (R;US)
Evolution of the scientific paper, 17:32571 (R;US)
INFORMATION SYSTEMS
Engineering Design Information System (EDIS) Information Services Division (ISD) Index Function: User's manual, 17:32575 (R;US)
INFRARED DIVERGENCES
Infrared singularities cancellation in reaction rates at finite temperature, 17:32115 (R;FR)
INFRARED RADIATION
See also NEAR INFRARED RADIATION
Optical properties of Er^{3+} and Tm^{3+} doped Y$_2$SiO$_5$, 17:31250 (R;FR)
YBCO based multilayers for optoelectronic devices, 17:31251 (R;FR)
INFRARED THERMOGRAPHY
Digital imaging systems: Final report, 17:31608 (R;US)
INJECTION (BEAMS)
See BEAM INJECTION
INJECTION FLUIDS
See DISPLACEMENT FLUIDS
INORGANIC POLYMERS
Construction and operating performance of apparatus for rotating irradiation fiber curing, 17:30790 (R;JP;In Japanese)
INSPECTION
See also IN-SERVICE INSPECTION
Constitutional and legal implications of arms control verification technologies, 17:31195 (R;US)
Functional system design document for the Intelligent Inspection System (IIS), 17:32570 (R;US)
INSTRUMENTS (MEASURING)
See MEASURING INSTRUMENTS
INSULATING LIMITERS
See LIMITERS

INSULATION (ELECTRICAL)
See ELECTRICAL INSULATION
INSULATION (THERMAL)
See THERMAL INSULATION
INTEGRALS
Numerical research of multiple integral, 17:32508 (R;CN;In Chinese)
INTEGRATED CIRCUITS
A temperature tracking SPICE2G.6 macromodel of the 6N134 optocoupler, 17:31418 (R;US)
An analog macromodel of the SG1525A PWM for use with SPICE2G.6 simulators, 17:31416 (R;US)
Development of XUV projection lithography at 60–80 nm, 17:31413 (R;US)
Investigation of soft errors in VLCIC RAM under influence of heavy ions, 17:31604 (R;SU;In Russian)
Log-ratio beam position monitoring at 425 MHz, 17:31510 (R;US)
INTENSIFIERS (IMAGE)
See IMAGE INTENSIFIERS
INTERFACES
Interfacial area and two-phase flow structure development measured by a double-sensor probe, 17:31387 (R;US)
INTERFACES (EQUIPMENT)
See EQUIPMENT INTERFACES
INTERMEDIATE RESONANCE
Off-shell effects in the dynamical model of pion photoproduction on nucleon, 17:32326 (R;SU)
INTERMEDIATE VECTOR BOSONS
See also Z NEUTRAL BOSONS
Probing new gauge boson couplings at hadron, 17:32185 (R;US)
INTERMEDIATE-LEVEL RADIOACTIVE WASTES
Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)
Quality assurance of radioactive waste packages by computerized tomography, 17:30692 (R;FR)
Radioactive waste package assay facility. Volume 1. Application of assay technology, 17:30688 (R;FR)
Radioactive waste package assay facility. Volume 2. Investigation of active neutron and active gamma interrogation, 17:30689 (R;FR)
Radioactive waste package assay facility. Volume 3. Data processing, 17:30690 (R;FR)
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
INTERNAL COMBUSTION ENGINES
See also DIESEL ENGINES
GAS TURBINE ENGINES
The intensity of knock in an internal combustion engine: An experimental and modeling study, 17:31159 (R;US)
INTERNATIONAL COMMISSION RADIOLOGICAL PROTECTION
See ICRP
INTERNATIONAL COOPERATION
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view, 17:31053 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 2, 17:31055 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view, 17:31053 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1, 17:31054 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 2, 17:31055 (R;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1, 17:31054 (R;JP;In Japanese)
INTERSECTING BEAMS
See COLLIDING BEAMS
INTESTINES
See also LARGE INTESTINE
Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
INTRUSION DETECTION SYSTEMS
Neural network sensor fusion for security applications, 17:31628 (R;US)
Security enhancement subproject: Protected area guard towers: Final environmental assessment, 17:31693 (R;US)
INVERTEBRATES
Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)
IODIDES
See also CESIUM IODIDES
CHROMIUM IODIDES
IRON IODIDES
NICKEL IODIDES
Batch-type tests on formations of volatile iodine species from aqueous iodide solution under ^{60}Co γ-rays irradiation, 17:31336 (RA;JP)
Effect of boiling upon radiolysis of iodide solution, 17:31326 (RA;JP)
IODINE
Adsorption
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
Chemical Reactions
A comparison of the predictions of the INSPECT reaction set with experimental data, 17:30894 (RA;JP)
Iodine chemistry in Falcon, 17:30893 (RA;JP)
Iodine chemistry in the presence of vinyl surfaces, 17:30944 (RA;JP)
Modelling of iodine chemistry: The LIRIC database, 17:32574 (RA;JP)
The kinetics of reaction between iodine vapour and bulk-material aerosols, 17:30872 (RA;JP)
Validation of the IODE code on analytical experiments, 17:30873 (RA;JP)
Containment Shells
The effects of zinc primer surfaces on iodine behaviour within containment, 17:30943 (RA;JP)
Fission Product Release
Iodine chemistry in the presence of vinyl surfaces, 17:30944 (RA;JP)
Large-scale experiments on iodine release associated with coolant flashing due to ruptured high-pressure tubes, 17:30945 (RA;JP)
The ace large scale iodine experiment at the Containment Systems Test Facility (CSTF), 17:31015 (RA;JP)
The effects of zinc primer surfaces on iodine behaviour within containment, 17:30943 (RA;JP)
The kinetics of reaction between iodine vapour and bulk-material aerosols, 17:30872 (RA;JP)
Precipitation
Aqueous solution of iodide under gamma ray irradiation: Fixation of iodide by adding soluble silver salt, 17:31335 (RA;JP)
Radionuclide Migration
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
Reactor Safety Experiments
Large-scale experiments on iodine release associated with coolant flashing due to ruptured high-pressure tubes, 17:30945 (RA;JP)
The ace large scale iodine experiment at the Containment Systems Test Facility (CSTF), 17:31015 (RA;JP)
Solubility
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in

cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
Volatility
ACE bench-scale studies of iodine volatility and interaction with epoxy painted surfaces, 17:31338 (RA;JP)
The Advanced Containment Experiments (ACE) Radioiodine Test Facility experimental program, 17:31339 (RA;JP)

IODINE 123
Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)

IODINE 124
Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)

IODINE 125
Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)

IODINE 129
Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor, 17:30685 (R;NL)
Investigations concerning the exchange of iodine from non-volatile organic iodine compounds. Final report, 17:30641 (I;DE;In German)
Processing flowsheet for the accelerator transmutation of waste (ATW) program, 17:30707 (R;US)

IODINE 131
Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)

IODINE COMPOUNDS
See also HYPOIODOUS ACID
IODIDES
Advanced Containment Experiments (ACE): Evaluation of pretest code calculations of iodine behaviour in the Radioiodine Test Facility, 17:31341 (RA;JP)
Studies on formation and transport of volatile iodine species in radiation field, 17:31325 (RA;JP)

IODINE IODIDES
See IODINE

IODINE ISOTOPES
See also IODINE 123
IODINE 124
IODINE 125
IODINE 129
IODINE 131
A new chemical model for the removal of iodine vapour from a reactor containment by aqueous sprays, 17:30876 (RA;JP)

ION ACOUSTIC WAVES
Dynamics of the ion-ion acoustic instability in the thermalization of ion beams, 17:32050 (R;US)

ION BEAM INJECTION
The european programme on negative ion beam development, 17:32442 (R;FR)

ION BEAMS
See also DEUTERON BEAMS
HYDROGEN 1 MINUS BEAMS
RADIOACTIVE ION BEAMS
Dynamics of the ion-ion acoustic instability in the thermalization of ion beams, 17:32050 (R;US)
North American radioactive beam initiatives, 17:31430 (R;US)

ION EXCHANGE MEMBRANES
See MEMBRANES

ION MOBILITY
Analysis of IMS spectra using neural networks, 17:31318 (R;US)

ION SOURCES
See also PENNING ION SOURCES
Calculation of ion charge-state distributions in ECR ion sources, 17:31490 (R;SU;In Russian)
Impact of slow gold clusters on various solids: Non linear effects in secondary ion emission, 17:32377 (R;FR)

ION SPECTROSCOPY
Artificial intelligence and neural networks applied to ion mobility spectrometry, 17:31304 (R;US)

ION-ATOM COLLISIONS
Dynamics and thermalization in violent collisions between ^{40}Ar and Ag at 27 MeV/nucleon, 17:32313 (R;FR)
Experimental study of interactions of highly charged ions with atoms at keV energies: Progress report, July 1, 1991–June 30, 1992, 17:32357 (R;US)
Proceedings of the workshop on 'spin-charge transfer reaction in atomic collision process' for planning of next period of cascade project, 17:32359 (R;JP;In Japanese)

ION-ION COLLISIONS
Energy damping and intermediate velocity fragment emission in peripheral Kr+Au collisions at 43 MeV/u, 17:32280 (R;FR)
Hard photon intensity interferometry in heavy ion reactions, 17:32253 (R;FR)

ION-MOLECULE COLLISIONS
Experimental study of interactions of highly charged ions with atoms at keV energies: Progress report, July 1, 1991–June 30, 1992, 17:32357 (R;US)

IONIC REACTIONS
See IONS

IONIZATION
See also PHOTOIONIZATION
Nonlinear shaping of a two-dimensional ultrashort ionizing pulse, 17:32409 (R;SE)

IONIZATION CALORIMETERS
See SHOWER COUNTERS

IONIZING RADIATIONS
See also COSMIC RADIATION
GAMMA RADIATION
X RADIATION
Carcinogenic risks from exposure to non-ionizing radiation: Updated in accordance with the latest findings of the commitees ICRP, BEIR and UNSCEAR, 17:31925 (RA;IL;In Hebrew)
Consistency of external dosimetry in epidemiologic studies of nuclear workers, 17:31987 (RA;US)
Health and dosimetry considerations in the ICRP 1990 formulation of effective dose, 17:31879 (RA;US)
Risk assessment from heterogeneous energy deposition in tissue, the problem of effects from low doses of ionizing radiation, 17:31878 (RA;US)
The employment of quartz glasses for dosimetry of ionic radiation, 17:31594 (RA;US)
The role of cellular and molecular studies in evaluation of health effects from combined radiation and chemical exposures, 17:31997 (R;US)

IONOPHORESIS
See ELECTROPHORESIS

IONOSPHERE
Dynamics of the ion-ion acoustic instability in the thermalization of ion beams, 17:32050 (R;US)

IONS
See also ARGON IONS
CHLORINE IONS
COPPER IONS
ERBIUM IONS
GOLD IONS
HEAVY IONS
KRYPTON IONS
LITHIUM IONS
NITROGEN IONS
THULIUM IONS
Fourier transform ion cyclotron resonance precision atomic mass measurement limits, 17:31620 (R;US)
The hydrophobic character of nonsulfide mineral surfaces as influenced by double-bond reactions of adsorbed unsaturated collector species: Progress report, 17:31295 (R;US)

IOWA UTR-10 REACTOR
Low enrichment fuel conversion for Iowa State University: Progress report, August 1, 1991–July 31, 1992, 17:30974 (R;US)

IRAQ
IAEA inspections and Iraq's nuclear capabilities, 17:30767 (I;XA)

IRIDIUM 181
Electromagnetic properties of ^{181}Ir: Evidence of β-stretching?, 17:32242 (R;US)

IRON 56
International evaluation cooperation task 1.1 : intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32284 (R;NL)

IRON 56 TARGET
The EFF-2 evaluation for the reaction systems n + ^{52}Cr, ^{56}Fe, ^{58}Ni and ^{60}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32282 (R;NL)

IRON 57
Transport processes of conversion electron in surface layers, 17:32371 (R;CN;In Chinese)

IRON ALLOYS
See also IRON BASE ALLOYS
The influence of processing atmosphere on twin-roll melt-spinning of aluminum alloys, 17:31228 (R;US)
Thermodynamic analysis of phase equilibria in the iron-zirconium system, 17:31204 (R;US)

IRON BASE ALLOYS
See also STEELS
Weak-beam imaging of dissociated dislocations in HVEM-irradiated Fe-Ni-Cr alloys, 17:31200 (R;US)

IRON COMPLEXES
See also FERROCYANIDES
Investigation on the gas-phase radiolysis of metal complexes, 17:31328 (R;JP;In Japanese)

IRON COMPOUNDS
See also IRON IODIDES
IRON OXIDES
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, June 1, 1991–August 31, 1991, 17:30479 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991, 17:30480 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991, 17:30478 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990, 17:30482 (R;US)

IRON IODIDES
Infrared spectra of the gaseous iodides of chromium, iron and nickel, 17:31227 (R;NL)

IRON OXIDES
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991, 17:30477 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990, 17:30476 (R;US)

IRRADIATION DEVICES
A revolving irradiation stage, 17:31350 (R;CN;In Chinese)
Construction and operating performance of apparatus for rotating irradiation fiber curing, 17:30790 (R;JP;In Japanese)

IRRADIATION RIGS
See IRRADIATION DEVICES

IRRIGATION
Soils newsletter. V. 15, no. 1, 17:31866 (I;XA)

ISING MODEL
Three-dimensional Ising Model and 2d-induced gravity, 17:32114 (R;FR)

ISOBARS (NUCLEON)
See N*BARYONS

ISOCHRONOUS CYCLOTRONS
See also OSLO CYCLOTRON
TRIUMF CYCLOTRON
Accelerating system simulation of U-200T isochronous cyclotron, 17:31436 (R;SU;In Russian)
Convertion project of the AS UzSSR cyclotron, 17:31435 (R;SU;In Russian)
Geometry choice and calculation of the U-200T isochronous cyclotron accelerating system, 17:31491 (R;SU;In Russian)

ISRAEL
^{36}Cl in rainwater in Israel, 17:31704 (IA;IL)
K-Ar measurements in the Hatrurim formation, Arad area, 17:31709 (IA;IL)
Radiation safety in Israel: Thoughts and expectations, 17:32578 (RA;IL;In Hebrew)
Radon in rock units in the Negev, Israel, 17:31710 (IA;IL)
Stable isotope geochemistry of dike/Inmar sandstone contact zones, Makhtesh Ramon, Israel, 17:31708 (IA;IL)
Supervising radiation protection in Israel: A new arrangement, 17:32577 (RA;IL;In Hebrew)

ITALY
Characterization of selected countries, 17:30555 (RA;US)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

ITER TOKAMAK
Japanese contribution of ITER PF systems design during CDA, 17:32460 (R;JP)
Magnetic fusion and project ITER, 17:32468 (R;US)
Report on the joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups, 17:32469 (R;US)
Structural analyses of ITER toroidal field coils under fault conditions, 17:32454 (R;NL)

ITERATIVE METHODS
See also NEWTON METHOD
The early days of the S$_n$ method, 17:32352 (R;US)

J

J PSI-3097 MESONS
Quantum effects and colour transparency in charmonium photoproduction on nuclei, 17:32324 (R;SU)
Some new aspects of the unitary and analytic VMD model for electromagnetic structure of hadrons, 17:32195 (R;SU)

J-3105 RESONANCES
See J PSI-3097 MESONS

JAPAN
Characterization of selected countries, 17:30555 (RA;US)
Preparation of geothermal resource map of Japan, 17:30833 (IA;JP;In Japanese)
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. General view, 17:31053 (R;JP;In Japanese)
Temperature gradient map of the Japanese Islands, 17:30850 (IA;JP;In Japanese)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

JAPANESE ORGANIZATIONS
Annual report of National Institute of Radiological Sciences of the fiscal year 1990, 17:32495 (R;JP;In Japanese)

JENSEN SARCOMA
See EXPERIMENTAL NEOPLASMS

JINR
JINR rapid communications: Collection, 17:31570 (R;SU)

JOINT INSTITUTE FOR NUCLEAR RESEARCH
See JINR

JUNCTIONS (SEMICONDUCTOR)
See SEMICONDUCTOR JUNCTIONS

K

K REACTOR
Actuator system history of safety rod lower latch problems review of latch inspection video tapes, 17:31039 (R;US)
Engineering evaluation of the General Motors (GM) diesel rating and capabilities, 17:31040 (R;US)
Particle blockage and flow degeneration in Savannah River Site reactor fuel/target assemblies, 17:31033 (R;US)
Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)
The steam explosion potential for an unseated SRS reactor septifoil, 17:31037 (R;US)
K^*RESONANCES
See STRANGE MESONS
K-1240 RESONANCES
See STRANGE MESONS
K-1871 RESONANCES
See STRANGE MESONS
KAHL-MAIN REACTOR
See HDR REACTOR
KAOLIN
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
KAON PLUS REACTIONS
The K^+ as a probe of nuclear medium effects, 17:32273 (R;US)
KAON-KAON INTERACTIONS
Analysis of $\pi\pi$ scattering with taking account of the KK-bar abd $\eta\eta$ thresholds, 17:32166 (R;SU;In Russian)
KAONS
See also KAONS NEUTRAL
Parameters of low-energy physics, radial excitations of π, K, D mesons and QCD potential, 17:32144 (R;SU)
KAONS NEUTRAL
Inclusive charged hadron and K^0 production in two-photon interactions, 17:32181 (R;US)
KAPPA-725 RESONANCES
See MESONS
KARLSRUHE NUCLEAR RESEARCH CENTER
See KERNFORSCHUNGSZENTRUM KARLSRUHE
KEK INTERS. STORAGE ACCELERATOR
See TRISTAN STORAGE RINGS
KEK LINAC
A simulation study on KEK positron generator, 17:31538 (RA;JP;In Japanese)
KEK PHOTON FACTORY
Photon Factory activity report, 1991, 17:32492 (R;JP)
KERNFORSCHUNGSZENTRUM KARLSRUHE
KfK Laboratory for Isotope Technology. Progress report on research and development activities in 1991, 17:32483 (R;DE;In German)
Program budget 1992 of the Karlsruhe Nuclear Research Center. As of November 19, 1991, 17:32491 (I;DE;In German)
KERNKRAFTWERK LINGEN
See LINGEN REACTOR
KERNKRAFTWERK RWE-BAYERNWERK
See RWE-BAYERNWERK REACTOR
KIDNEYS
Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)
Radiation dosimetry for Tc-99m MAG3 in adults and children, 17:31903 (RA;US)
KILN INCINERATORS
See INCINERATORS
KIWI REACTORS
Liquid hydrogen flow problems in Kiwi reactors, 17:30915 (R;US)
KIWI TYPE REACTORS
See KIWI REACTORS
KLYSTRONS
SLAC modulator operation and reliability in the SLC Era, 17:31526 (R;US)
KNOCK-ON ELECTRONS
See ELECTRONS
KNOWLEDGE BASE
Analysis and evaluation of knowledge base and rule.: Development of analysis method of histogram data (distribution of chlorine concentration in the hot spring waters in Japan), 17:30852 (IA;JP;In Japanese)
KOREA (SOUTH)
See REPUBLIC OF KOREA
KRB REACTOR
See RWE-BAYERNWERK REACTOR
KRYPTON FLUORIDE LASERS
Study of electron-beam-pumped KrF laser kinetics and calculation of energy deposition, 17:32048 (R;CN;In Chinese)
KRYPTON IONS
Dione status report, 17:32275 (R;FR)
KWL REACTOR
See LINGEN REACTOR

L

L CODES
LAPACK Working Note 9: A test matrix generation suite, 17:32504 (R;US)
LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)
LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32532 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32533 (CM;US)
LEOPARDSPOTS: Spectrum calc with depletion, 17:32534 (CM;US)
LFK: Livermore FORTRAN kernel computer test, 17:32527 (CM;US)
L REACTOR
Actuator system history of safety rod lower latch problems review of latch inspection video tapes, 17:31039 (R;US)
Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)
L-1770 RESONANCES
See STRANGE MESONS
LA REINA REACTOR
See RESEARCH REACTORS
LA SALLE COUNTY-2 REACTOR
Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP): Volume 3, Part 2, Internal events accident sequence quantification: Appendices, 17:31023 (R;US)
LABORATORIES
Project 8980: Fluorophotometers for laboratory services, 17:31357 (R;US)
Risk assessment technique for evaluating research laboratories, 17:32007 (R;US)
LAGRANGE FIELD EQUATIONS
See LAGRANGIAN FIELD THEORY
LAGRANGIAN FIELD THEORY
BRST field theory of relativistic particles, 17:32465 (R;NL)
Nuclear physics in a swelled world, 17:32203 (R;FR)
The Mathai-Quillen formalism and topological field theory, 17:32125 (R;NL)
LAMBDA BARYONS
Electroproduction of polarized Λ's, 17:32187 (R;FR)
LAMINOGRAPHY
See TOMOGRAPHY
LAND FILLS
See SANITARY LANDFILLS
LANDFILLS
See SANITARY LANDFILLS

LANGUAGES (PROGRAMMING)
See PROGRAMMING LANGUAGES

LARGE INTESTINE
See also RECTUM
Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts, 17:31804 (RA;US)
External beam and radioimmunotherapy dosimetry comparison of colorectal xenografts, 17:31883 (RA;US)
Intratumoral injection of 5-^{125}I-iodo-2′-deoxyuridine in patients with colon cancer, 17:31817 (RA;US)
Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc, 17:31834 (RA;US)

LASER MATERIALS
Preparation, optical and laser properties of Nd-doped sol-gel silica, 17:32476 (R;US)
Stimulated Brillouin processes in crystals and glasses: Final report, September 17, 1986–October 31, 1991, 17:32479 (R;US)

LASER RADIATION
Hot-wire vs laser, is there a difference?, 17:31633 (R;US)
Numerical modelling of the suppression of stimulated Brillouin scattering due to finite laser bandwidth, 17:31420 (R;US)

LASER WELDING
Characterizing laser fusion welded aluminum using synchrotron x-ray microtomography, 17:31406 (R;US)

LASER-PRODUCED PLASMA
LANSA: A large neutron scintillator array for neutron spectroscopy at Nova, 17:32473 (R;US)
Recent Nova experimental results, 17:32478 (R;US)
Self-consistent one-dimensional modelling of x-ray laser plasmas, 17:31422 (R;US)

LASERS
See also FREE ELECTRON LASERS
X-RAY LASERS
Theoretical study of aluminium-copper impedance matching targets for laser-high-pressure state equation, 17:31411 (R;CN;In Chinese)

LATENT HEAT STORAGE
Latent heat thermal energy storage for lunar oxygen production, 17:31042 (R;US)

LATTICE DEFECTS
See CRYSTAL DEFECTS

LAWRENCE LIVERMORE LABORATORY
Energy and Technology Review, April–May 1992, 17:31768 (R;US)
Engineering research, development and technology: Thrust area report FY 91, 17:31346 (R;US)
Laboratory directed research and development FY91: Revision 1, 17:31285 (R;US)

LAYERS
See also BOUNDARY LAYERS
Silicide layer growth rates in Mo/Si multilayers, 17:31244 (R;US)

LEACHATES
Pilot- and field-scale uranium lysimeter studies at the Oak Ridge Y-12 Plant, 17:30754 (R;US)

LEAD
Experimentation and simulation of gravity fed lead castings, 17:31236 (R;US)
Materials compatibility and corrosion issues for accelerator transmutation of waste, 17:30704 (R;US)
Quasielastic scattering using the (p,n) reaction at 795 MeV, 17:32338 (R;US)

LEAD 207 TARGET
Charge-exchange cross sections of the $^{3}H \rightarrow {}^{3}He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)

LEAD 210
Concentrations of ^{210}Pb in uranium miners' lungs and its state of equilibria with ^{238}U, ^{234}U, and ^{230}Th, 17:31949 (IA;CA)

LEAD BASE ALLOYS
LIPSIE experiment: Pb17Li irradiation in water loop with on line tritium measurements, 17:32441 (R;FR)

LEAD OXIDES
Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)

LEAK TESTING
4th international school of nondestructive testing, 17:31403 (I;CS;In Czech, Slovak)
Using helium mass-spectrometer leak detector to detect the leak of vaporizer in Qinshan nuclear power plant, 17:30885 (R;CN;In Chinese)

LEAKAGE
See LEAKS

LEAKS
Test results for Supplement A to Production Test IP 358 AC, 17:30989 (R;US)

LEAST SQUARE FIT
A simple algorithm for large, non-linear or singular least squares problems, 17:32560 (R;NO)

LENSES
See also FRESNEL LENS
Laser surface profilometer with sub-Angstrom resolution, 17:31610 (R;US)

LEP STORAGE RINGS
Development of high resolution double-sided silicon detectors with projective readout, 17:31548 (R;FR;In French)
Search for new phenomena at LEP, 17:32168 (R;FR)
Study of Tau lepton decays with ALEPH detector at LEP, 17:32175 (R;FR;In French, English)

LEPTON NUMBER
Baryon and lepton number violation in the standard model at high energy, 17:32122 (R;US)

LEPTON-NUCLEON INTERACTIONS
See also LEPTON-PROTON INTERACTIONS
The spin of the nucleon in deep inelastic lepton scattering experiments, 17:32188 (R;US)

LEPTON-PROTON INTERACTIONS
The meson contribution to semi-inclusive deep inelastic scattering with slow protons in the final state, 17:32161 (IA;DE)

LEUCOCYTES
See LEUKOCYTES

LEUKEMIA VIRUSES
Serological studies on bovine leukemia virus (BLV) infection in Costa Rica by ELISA, immunodiffusion and Western blot tests, 17:31863 (RA;XA)

LEUKOCYTES
See also LYMPHOCYTES
MONOCYTES
Comparative PMN granulocyte retention of In-111 and Tc-99m HMPAO labeled PMN granulocyte of dogs on cellulose acetate hemodialyzers (HD), 17:31841 (RA;US)
Comparative loss of In-111 labeled PMN granulocyte from dog, pig and man to cellulose acetate hemodialyzer (HD), 17:31842 (RA;US)

LEUKOPENIA
Comparative PMN granulocyte retention of In-111 and Tc-99m HMPAO labeled PMN granulocyte of dogs on cellulose acetate hemodialyzers (HD), 17:31841 (RA;US)
Comparative loss of In-111 labeled PMN granulocyte from dog, pig and man to cellulose acetate hemodialyzer (HD), 17:31842 (RA;US)

LEVITATED TRAINS
Acceleration
Sustained passenger G-loads in Maglev: Needs and payoffs (Magnetic levitation), 17:31183 (RA;US)
Alarm Systems
Need for the detection of guideway misalignment and foreign objects, 17:31181 (RA;US)
Commercialization
Institutional obstacles to the development of Maglev in the United States (Magnetic levitation), 17:31184 (RA;US)
Control Systems
Active damping of Maglev vehicles using superconducting linear synchronous motors, 17:31176 (RA;US)

Damping
Active damping of Maglev vehicles using superconducting linear synchronous motors, 17:31176 (RA;US)
Design
An integrated approach to develop conductors, coils, cryogenic system, on-board magnet assembly, 17:31178 (RA;US)
Maglev system concept using 20-K high-temperature superconductors (Magnetic levitation), 17:31165 (RA;US)
Parametric studies of suspension and propulsion subsystems in a Maglev transportation system, 17:31179 (RA;US)
Information Needs
Development of (1) cable in conduit conductors and of (2) an approach to FMECA for Maglev magnet systems (Magnetic levitation), 17:31170 (RA;US)
High efficiency propulsion and levitation systems, 17:31175 (RA;US)
Magnet research required for Maglev (Magnetic levitation), 17:31169 (RA;US)
Safety factors on Maglev systems (Magnetic levitation), 17:31182 (RA;US)
Sustained passenger G-loads in Maglev: Needs and payoffs (Magnetic levitation), 17:31183 (RA;US)
The impact of right-of-way geometry on ride quality, 17:31180 (RA;US)
Use of AC suspension magnets for Maglev propulsion and levitation (Magnetic levitation), 17:31177 (RA;US)
Institutional Factors
Institutional obstacles to the development of Maglev in the United States (Magnetic levitation), 17:31184 (RA;US)
Magnetic Fields
Design of advanced stray field shielding for Maglev (Magnetic levitation), 17:31164 (RA;US)
Magnetic Shielding
Design of advanced stray field shielding for Maglev (Magnetic levitation), 17:31164 (RA;US)
Emerging Maglev research needs (Magnetic levitation), 17:31166 (RA;US)
Magnetic shielding in Maglev (Magnetic levitation), 17:31167 (RA;US)
Research Programs
Federal Maglev program (Magnetic levitation), 17:31162 (RA;US)
International Maglev technology center (Magnetic levitation), 17:31163 (RA;US)
New York State Maglev related programs, 17:31161 (RA;US)
Threshold Maglev research and development program - A no regrets approach to Maglev R and D (Magnetic levitation), 17:31185 (RA;US)
Rights-Of-Way
The impact of right-of-way geometry on ride quality, 17:31180 (RA;US)
Safety Engineering
Need for the detection of guideway misalignment and foreign objects, 17:31181 (RA;US)
Safety factors on Maglev systems (Magnetic levitation), 17:31182 (RA;US)
Simulation
Simulation of Maglev ride environment (Magnetic levitation), 17:31168 (RA;US)
Superconducting Magnetic Energy Storage
Emerging Maglev research needs (Magnetic levitation), 17:31166 (RA;US)
Superconducting Magnets
Cryogenic refrigeration for Maglev requirements and opportunities, 17:31172 (RA;US)
He II and Maglev - Is there a role? (Magnetic levitation), 17:31173 (RA;US)
Light weight, high field, stable, superconducting magnets for advanced transportation systems, 17:31171 (RA;US)
R and D needs and opportunities for application of space vehicle cryogenic technology to Maglev systems (Magnetic levitation), 17:31174 (RA;US)
Technology Assessment
High efficiency propulsion and levitation systems, 17:31175 (RA;US)
Use of AC suspension magnets for Maglev propulsion and levitation (Magnetic levitation), 17:31177 (RA;US)

LIE GROUPS
See also CONFORMAL GROUPS
A quasi-parafermionic realization of G_2 and $U_q(G_2)$, 17:32040 (R;FR)
LIFE SHORTENING
See LIFE SPAN
LIFE SPAN
New type of radiation aftereffect: study of life span in generations of irradiated drosophila, 17:31976 (RA;SU;In Russian)
LIGHT WATER COOLED REACTORS
See WATER COOLED REACTORS
LIGHTNING
Lightning threat warning system at the Tonopah Test Range, 17:31639 (R;US)
LIGNITE
An EPR spin probe method for characterizing changes in the accessible regions of coal upon oxidation, 17:30461 (R;US)
Formation and retention of methane in coal: Final report, 17:30470 (R;US)
LIMESTONE
Bacterially induced precipitation of $CaCO_3$: An example from studies of cyanobacterial mats: Final report, 17:31645 (R;US)
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991, 17:30600 (R;US)
LIMITERS
Effects of limiter biasing on the ATF torsatron, 17:32433 (R;US)
LINACS
See LINEAR ACCELERATORS
LINEAR ACCELERATORS
See also CEBAF ACCELERATOR
KEK LINAC
LINEAR COLLIDERS
MEA LINAC
STANFORD LINEAR COLLIDER
Alternating-phase focusing: A model to study nonlinear dynamics, 17:31445 (R;US)
An engineering upgrade of the CWDD injector, 17:31472 (R;US)
Calculations of LINAC spectrum characteristics using EGS4, 17:31503 (RA;JP;In Japanese)
Electron-beam diagnostics development for the Los Alamos FEL facility, 17:31511 (R;US)
Linac beam dynamics calculations for low-current large-emittance beams, 17:31461 (R;US)
Radio-frequency linear ion accelerator (proposal for development of the acceleration for ion beam implantation), 17:31437 (R;SU;In Russian)
Rf system specifications for a linear accelerator, 17:31514 (R;US)
The BNL Accelerator Test Facility and experimental program, 17:31429 (R;US)
The Brookhaven National Laboratory Accelerator Test Facility, 17:31428 (R;US)
Variational characteristics of ion injector for a linear accelerator, 17:31518 (R;SU;In Russian)
LINEAR COLLIDERS
Review of studies on conventional linear colliders in the S- and X-Band regime, 17:31440 (R;US)
LINERS
Ovality of the steel lining in the HAW test field, 17:30683 (R;NL)
LINGEN REACTOR
Kernkraftwerk Lingen GmbH: Safe enclosure. Annual report 1991, 17:30870 (I;DE;In German)
LIPOPROTEINS
Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein, 17:31892 (RA;US)
Comparison of methods for incorporating a radioiodinated residualizing cholesteryl ester analog into low density lipoprotein, 17:31812 (RA;US)
Enhancement of liver uptake of a radioiodinated triglyceride analog by prior incorporation into a lipoprotein-like emulsion, 17:31917 (RA;US)

In vivo metabolism of I-123 labeled semisynthetic low density lipoproteins: Final technical report, September 28, 1988–September 27, 1990, 17:31776 (R;US)
Synthesis and evaluation of radioiodinated cholesteryl ethers as lipoprotein probes, 17:31813 (RA;US)
Tc^{99m}-LDL as tracer for LDL-receptor mediated processes, 17:31802 (RA;US)
Tc^{99m}-LDL kinetics in the isolated perfused rat liver, 17:31814 (RA;US)

LIQUID COLUMN CHROMATOGRAPHY
HPLC studies of aquatic humic compounds and complexes from the Drigg research site, Cumbria, 17:30698 (R;FR)

LIQUID EFFLUENTS
See LIQUID WASTES

LIQUID METAL COOLANT
See LIQUID METALS

LIQUID METAL TEST FACILITIES
See TEST FACILITIES

LIQUID METALS
Refractory thermowell for continuous high temperature measurement of molten metal, 17:31609 (PA;US)

LIQUID PHASE METHANOL PROCESS
Liquid Phase Methanol LaPorte PDU: Modification, operation, and support studies: Quarterly technical progress report No. 4, 1 April–30 June 1988, 17:30452 (R;US)

LIQUID WASTES
See also SPENT LIQUORS
WASTE WATER
Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Developments in geothermal waste treatment biotechnology, 17:30853 (R;US)
Waste minimization in the oil and gas industries, 17:30578 (R;US)

LIQUIDS
See also LIQUID METALS
Operating characteristics of rotating beds: Technical progress report for the third quarter 1988, 17:31297 (R;US)

LITHIUM 7 REACTIONS
Charge exchange $^{7}Li \rightarrow ^{7}Be$ cross sections at 21 GeV/c on H,C,Al,Cu, Pb nuclei, 17:32331 (R;SU;In Russian)

LITHIUM ALLOYS
Interactions between drops of molten Al-Li alloys and liquid water, 17:31029 (R;US)
LIPSIE experiment: Pb17Li irradiation in water loop with on line tritium measurements, 17:32441 (R;FR)

LITHIUM IONS
Dione status report, 17:32275 (R;FR)

LITHIUM OXIDES
Fabrication, properties and tritium release rates of lithium zirconates: Paper presented at the 'Third International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93rd Annual Meeting of the American Ceramic Society', Cincinnati, Ohio, April 28-May 2, 1991, 17:32452 (R;NL)
Modeling of tritium behavior in Li_2O, 17:32438 (R;US)

LIVER
Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
Enhancement of liver uptake of a radioiodinated triglyceride analog by prior incorporation into a lipoprotein-like emulsion, 17:31917 (RA;US)
Hepatic uptake of a radiolabeled monoclonal antibody is not receptor-mediated, 17:31803 (RA;US)
Tc^{99m}-LDL kinetics in the isolated perfused rat liver, 17:31814 (RA;US)
The stability in liver homogenate of In and Y anti-CEA antibody radiolabeled via DTPA and SCN-Bz-DTPA, 17:31807 (RA;US)

LIVESTOCK
See DOMESTIC ANIMALS

LMFBR TYPE REACTORS
An improved numerical model for the investigation of thermal hydraulic phenomena with applications to LMR reactor components, 17:30911 (R;US)
Assessment of prism responses to loss of flow events, 17:31004 (R;US)
Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)
Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
Integrated intra-subassembly treatment in the SASSYS-1 LMR systems analysis code, 17:30910 (R;US)

LOCAL BOILING
See SUBCOOLED BOILING

LONG WAVE RADIATION
Cellular and molecular pathways of extremely-low-frequency electromagnetic field interactions with living systems, 17:32006 (R;US)

LOOPS (IN PILE)
See IN PILE LOOPS

LOSS OF FLOW
Asymmetric flow events in a VEER 1000, 17:30998 (R;US)

LOW ALLOY STEELS
See also STEEL-MNNIMO
Development of a local approach for the intergranular fracture in low alloy steels, 17:31209 (R;FR)
Effect of a sustained load and a low loading rate on 16 MND5 steel ductile tearing resistance, 17:31207 (R;FR;In French)

LOW DOSE IRRADIATION
Low dose radiation effects: a holistic model, 17:31960 (RA;SU)

LOW FREQUENCY RADIATION
See LONG WAVE RADIATION

LOW-LEVEL RADIOACTIVE WASTES
Certification
Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)
Computer Calculations
Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)
Containers
Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)
Gamma Sources
Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)
Grouting
Grout treatment facility dangerous waste permit application: Revision 2: Volume 2, 17:30671 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 3, 17:30672 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 4, 17:30673 (R;US)
In-Situ Processing
Cost performance assessment of in situ vitrification, 17:30706 (R;US)
Neutron Detection
Waste crate counter design, 17:30708 (R;US)
Nondestructive Analysis
Characterization of radioactive mixed wastes: The industrial perspective, 17:30705 (R;US)
Nondestructive Testing
Development of a non-destructive experimental method and a calculation procedure for the identification and quantification of gamma emitter radionuclides in packages containing low and medium-level radioactive wastes, 17:30693 (R;FR)
Packaging
Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)

- **Radioactive Waste Disposal**
  - Pilot- and field-scale uranium lysimeter studies at the Oak Ridge Y-12 Plant, 17:30754 (R;US)
  - Report on Fiscal Year 1991 financial statement audit of the Low-Level Radioactive Waste Surcharge Escrow Account (CR-FC-92-1), 17:30664 (R;US)
  - Review of available options for low level radioactive waste disposal, 17:30701 (R;XA)
- **Radioactive Waste Processing**
  - Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)
  - Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3, 17:30676 (R;US)
  - Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5, 17:30677 (R;US)
- **Radioactive Waste Storage**
  - Annotated list of regulations and guidance applicable to temporary storage of commercial Low-Level Radioactive Waste, 17:30667 (R;US)
  - Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)
  - Leak testing plan for the Oak Ridge National Laboratory liquid low- level waste system (active tanks): Volume 1, Regulatory background and plan approach; Volume 2, Methods, protocols, and schedules; Volume 3, Evaluation of the ORNL/LT-823DP differential pressure leak detection method: Environmental Restoration Program, 17:30645 (R;US)
  - Low-Level Radioactive Waste temporary storage issues, 17:30666 (R;US)
- **Sampling**
  - Characterization of radioactive mixed wastes: The industrial perspective, 17:30705 (R;US)
- **Vitrification**
  - Cost performance assessment of in situ vitrification, 17:30706 (R;US)

LTH
- In vivo studies of ethanol on prolactin and luteinizing hormone in rats, 17:32003 (RA;US)

LUNGS
- Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
- Correlation of lipophilicity to biodistribution of Tc-99m labelled aminothiols, 17:31782 (RA;US)
- $Ga(NO_3)_3$ uptake by human-derived small cell lung cancer cells, 17:31789 (RA;US)
- Purification of radiolabeled monoclonal antibodies to angiotensin-converting enzyme significantly improves specificity and efficacy of its targeting into the lung, 17:31788 (RA;US)
- Uranium bearing particles in miners' and millers' lungs, 17:31951 (IA;CA)

LUTEOTROPIC HORMONE
- *See* LTH

LUTETIUM
- The isolation of lutetium from gadolinium contained in Purex process solutions, 17:30643 (R;US)

LWR TYPE REACTORS
- *See* WATER COOLED REACTORS

LYMPHOCYTES
- Comparative study of qualitative cytogenetic effects induced by fractionated γ-neutron irradiation in man lymphocytes at G_0 and G_1 stages, 17:31970 (RA;SU;In Russian)
- Cytogenetics of radiation-induced adaptation in man lymphocytes, 17:31973 (RA;SU;In Russian)
- Effects of irradiation on normal human lymphocytes, 17:31872 (R;CN;In Chinese)
- Modulate function and effect of ^{60}Co γ-rays on ConA-induced CD_4^+ and CD_8^+ subpopulations of lymphocytes, 17:31874 (R;CN;In Chinese)
- The use of a scanning proton microprobe in AIDS research, 17:31852 (IA;AU)
- X-radiation and hydrogen peroxide induce adaptation of lymphocytes of man peripheral blood to subsequent x-irradiation, 17:31972 (RA;SU;In Russian)

LYMPHOID CELLS
- *See* LYMPHOCYTES

M

M CODES
- METD: Computer code systems to use with meteorological data, 17:32548 (CM;US)
- METD: Computer code systems to use with meteorological data, 17:32549 (CM;US)

MA 754
- *See* NICKEL BASE ALLOYS

MA 956
- *See* IRON BASE ALLOYS

MACROPHAGES
- Targeting of macrophages for the scintigraphic evaluation of inflammatory lesions in a model of radio-induced inflammation in pigs, 17:31769 (R;FR)
- The effects of ^{60}Co γ-ray irradiation on the cytoskeleton of mouse peritoneal macrophages and human peripheral blood monocytes in vitro, 17:31873 (R;CN;In Chinese)

MAGNESIUM
- Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)

MAGNESIUM 24
- Evidence for alpha-particle chain configurations in ^{24}Mg, 17:32212 (R;US)

MAGNESIUM ALLOYS
- The effect of precipitate forming elements in Al 4.5% Mg alloys on the measured acoustic emission and on Lueders band deformation, 17:31239 (R;US)

MAGNESIUM HYDROXIDES
- Confined zone dispersion flue gas desulfurization demonstration: Volume 1, Quarterly report No. 4, August 1, 1991–October 31, 1991, 17:30484 (R;US)

MAGNET COILS
- *See also* PULSED MAGNET COILS
- Mechanical behaviour of a closed collar model for an 11.5 T dipole magnet, 17:31519 (R;NL)
- Structural analyses of ITER toroidal field coils under fault conditions, 17:32454 (R;NL)

MAGNETIC BREMSSTRAHLUNG
- *See* SYNCHROTRON RADIATION

MAGNETIC COILS
- *See* MAGNET COILS

MAGNETIC CONFINEMENT
- Fusion, magnetic confinement, 17:32421 (R;US)
- Magnetic fusion and project ITER, 17:32468 (R;US)
- Performance of a plasma fluid code on the Intel parallel computers, 17:32405 (R;US)
- Transport in a stochastic magnetic field, 17:32435 (R;US)

MAGNETIC FIELDS
- A weighted iterative algorithm for neuromagnetic imaging, 17:31850 (R;US)
- Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 2, Appendices, 17:32005 (R;US)
- Investigation of effects of 60-Hz electric and magnetic fields on operant and social behavior and on the neuroendocrine system of nonhuman primates: Quarterly report 37 - Part 1, Text, 17:32004 (R;US)
- The anomalous transport caused by magnetic perturbation in tokamak, 17:32446 (R;CN)
- The calculations of magnetic diffusion constant and Kolmogorov entropy in a stochastic field region, 17:32396 (R;CN;In Chinese)

MAGNETIC LEVITATED TRAINS
- *See* LEVITATED TRAINS

MAGNETIC MIRRORS
See also REVERSED-FIELD MIRRORS
Observation of spatial resolution of ECR plasma on the MM-2 magnetic mirror, 17:32401 (R;CN;In Chinese)
MAGNETIC SPECTROMETERS
Analysis of field space distribution of a spectrometric magnet, 17:31617 (R;SU;In Russian)
MAGNETOHYDRODYNAMIC GENERATORS
See MHD GENERATORS
MAGNETOHYDRODYNAMICS
Advanced high-explosive flux compression generator development: The CN-III series, 17:31636 (R;US)
MAGNETOMETERS
Hall-effect device of high accuracy, 17:31619 (R;SU;In Russian)
MAGNETOTELLURIC SURVEYS
Analysis and evaluation of resistivity data.: MT profiling of the southerm Tohoku district, 17:32010 (IA;JP;In Japanese)
MAGNETS
Mechanical equipment for magnet measurement and alignment, 17:31523 (R;US)
Ross Priory workshop presentation, 17:31360 (R;US)
MAHOGANY TREES
See TREES
MALIGNANCIES
See NEOPLASMS
MAMMARY GLANDS
Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated F(ab')$_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8, 17:31832 (RA;US)
Labeling, control and radiopharmaceutical evaluation of ^{99m}Tc-ADP as tumor seeking agent, 17:31818 (RA;US)
Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model, 17:31821 (RA;US)
Risk assessment - benefit in scanning medical examination for early detection of breast cancer by means of mammography, 17:31927 (RA;IL;In Hebrew)
MAN-MACHINE SYSTEMS
Human perceptual deficits as factors in computer interface test and evaluation, 17:31623 (R;US)
MANGANESE 54
200 Areas operation monthly report, September 1967, 17:30635 (R;US)
Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)
MANUFACTURING FACILITIES
See INDUSTRIAL PLANTS
MAPS
Basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map 'Niigata', 17:30836 (IA;JP;In Japanese)
Temperature gradient map of the Japanese Islands, 17:30850 (IA;JP;In Japanese)
MARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS
MARINE VEHICLE ACCIDENTS
See ACCIDENTS
MARTENSITIC STEELS
9Cr-1Mo martensitic alloys: effects of the nitrogen, niobium and vanadium additions on the microstructure, phase transformations and mechanical properties, 17:31211 (R;FR;In French)
MASS
Fourier transform ion cyclotron resonance precision atomic mass measurement limits, 17:31620 (R;US)
MASS SPECTROMETERS
Enhancement of ion transmission and reduction of background and interferences in inductively coupled plasma mass spectrometry, 17:31300 (R;US)
MASS SPECTROSCOPY
Enhancement of ion transmission and reduction of background and interferences in inductively coupled plasma mass spectrometry, 17:31300 (R;US)
MASSLESS PARTICLES
See also NEUTRINOS
PHOTONS
Parasupersymmetric spinning particle and topological gauge fields, 17:32105 (R;SU)
MATERIALS
See also BUILDING MATERIALS
COMPOSITE MATERIALS
ENVIRONMENTAL MATERIALS
GRANULAR MATERIALS
HAZARDOUS MATERIALS
LASER MATERIALS
MATRIX MATERIALS
POROUS MATERIALS
RADIOACTIVE MATERIALS
REINFORCED MATERIALS
SEALING MATERIALS
THERMONUCLEAR REACTOR MATERIALS
Bifurcations in elastic-damaging materials, 17:32366 (R;US)
Interfacial microchemical characterization needs in surface processing, 17:31143 (R;US)
Proceedings of the tenth symposium on energy engineering sciences: Synergism of analysis, modeling, and experiment, 17:31351 (R;US)
Thermodynamically consistent theories for elastoplasticity coupled with damage, 17:31242 (R;US)
MATERIALS (BUILDING)
See BUILDING MATERIALS
MATERIALS (COMPOSITE)
See COMPOSITE MATERIALS
MATERIALS (ENVIRONMENTAL)
See ENVIRONMENTAL MATERIALS
MATERIALS (POROUS)
See POROUS MATERIALS
MATERIALS (REINFORCED)
See REINFORCED MATERIALS
MATERIALS HANDLING
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)
MATERIALS TESTING
See also NONDESTRUCTIVE TESTING
Neutron metrology in the HFR: Steel irradiation in the HFR R139-656, 17:30983 (R;NL)
MATHEMATICAL MODELS
See also COSMOLOGICAL MODELS
FLOW MODELS
GENERAL CIRCULATION MODELS
PARTICLE MODELS
Testing near-field models for deep disposal, 17:30732 (RA;SE)
MATHEMATICS
DOE Fundamentals Handbook: Mathematics, Volume 1, 17:30936 (R;US)
DOE Fundamentals Handbook: Mathematics, Volume 2, 17:30937 (R;US)
MATRICES
LAPACK Working Note 9: A test matrix generation suite, 17:32504 (R;US)
Optimization of expressions involving array classes, 17:32563 (R;US)
ScaLAPACK: A scalable linear algebra library for distributed memory concurrent computers, 17:32514 (R;US)
The efficient parallel iterative solution of large sparse linear systems, 17:32503 (R;US)
MATRIX MATERIALS
Evaporation measurement in the validation drift - part 3: Comparison between the first and second set of measurement results, 17:31744 (R;SE)
Quality assurance of radioactive waste packages by computerized tomography, 17:30692 (R;FR)
MAXWELL EQUATIONS
Prediction of electromagnetic pulse generation by picosecond avalanches in high-pressure air, 17:31421 (R;US)

MEA LINAC
Injecting into AmPS when ring cavity operates at 476 MHz, 17:31520 (R;NL)
Using the 16 viewscreens during commissioning of AmPS, 17:31462 (R;NL)

MEAN-FIELD THEORY
The finite temperature QED vacuum, within the mean field approximation, 17:32129 (R;FR;In French)

MEASURING INSTRUMENTS
See also ANEMOMETERS
DENSIMETERS
DOSEMETERS
MAGNETOMETERS
MONITORS
RADIATION DETECTORS
SPECTROMETERS
SPECTROPHOTOMETERS
THERMOCOUPLES
Compilation of a gravity map on 1/500,000 Niigata sheet, 17:32009 (IA;JP;In Japanese)
Experimental apparatus for the study of flowing granular materials, 17:30518 (RA;US)
Measurement of radiant properties of fly ash dispersions, 17:30464 (RA;US)
Using a straightness reference in obtaining more accurate surface profiles from a Long Trace Profiler, 17:31516 (R;US)
Validating criticality calculations for spent fuel with ^{252}Cf-source-driven noise measurements, 17:31352 (R;US)

MECHANICS
See also CLASSICAL MECHANICS
FLUID MECHANICS
FRACTURE MECHANICS
QUANTUM MECHANICS
Proceedings of the tenth symposium on energy engineering sciences: Synergism of analysis, modeling, and experiment, 17:31351 (R;US)

MEDICINES
See DRUGS

MEGAKARYOCYTES
See BONE MARROW CELLS

MELANOCYTES
See ANIMAL CELLS

MEMBRANES
See also CELL MEMBRANES
Remediating biofouling of reverse osmosis membranes, 17:31367 (R;US)

MERCURY 192
Lifetimes of the low spin states in the superdeformed band of ^{192}Hg, 17:32243 (R;US)

MERCURY COMPOUNDS
Control of mercury emissions from coal-fired boilers, 17:30475 (R;US)

MESON FACTORIES
Beam-beam diagnostics from closed-orbit distortion, 17:31465 (R;US)
Meson physics at Saturne, 17:32162 (R;FR)

MESON RESONANCES
See MESONS

MESON-NUCLEON INTERACTIONS
Analysis of discrete ambiguities for $\pi N \Delta$ and $\rho N \Delta$ vertex functions using inclusive charge-exchange reactions, 17:32256 (IA;DE)

MESONS
See also BEAUTY MESONS
CHARMONIUM
STRANGE MESONS
Medium effects on quark and meson masses, 17:32191 (IA;DE)

METABOLISM
Macro-and micro-autoradiographic study in comparison with the incorporation of ^{35}S-methionine by various tissue protein in organism, 17:31857 (R;CN;In Chinese)

METAGALAXY
See UNIVERSE

METAL INDUSTRY
Model for predicting the evolution of steel temperature in a continuous casting tundish on the basis of expert knowledge, 17:31199 (R;FI)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Management Plan, 17:31126 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Research Plan, 17:31127 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Annual report, Fiscal Year 1991, 17:31220 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Research Plan, 17:31127 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Annual report, Fiscal Year 1991, 17:31220 (R;US)
Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988: Management Plan, 17:31126 (R;US)

METALS
See also ACTINIDES
ALUMINIUM
CADMIUM
GERMANIUM
LEAD
LIQUID METALS
TRANSITION ELEMENTS
A method of noncontacting ultrasonic process monitoring, 17:31262 (PA;US)
Analysis of collective resonances in clusters: Metals and carbon, 17:32367 (R;US)
Electronic excitations in metallic systems: from defect annihilation to track formation, 17:32375 (R;FR)
Experimental studies of cascade phenomena in metals, 17:31203 (R;US)
Is there a unique effective interaction profile for dislocations?, 17:31235 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)
Simulation of forward-backward extrusion with numerical and model material techniques, 17:31231 (R;US)

METAMORPHIC ROCKS
Age relationships from U-Th-Pb isotope studies of uranium mineralization in Wernecke breccias, Yukon Territory, 17:30605 (RA;CA)

METEOROLOGY
METD: Computer code systems to use with meteorological data, 17:32548 (CM;US)
METD: Computer code systems to use with meteorological data, 17:32549 (CM;US)

METER WAVE RADIATION
See RADIOWAVE RADIATION

METHANE
A correlated K-distribution model of the heating rates for CH_4 and N_2O in the atmosphere between 0 and 60 km, 17:31676 (R;US)
The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)
Thermal pretreatment effect on polycrystalline tin dioxide electrical properties. Application to methane detection, 17:31615 (R;FR;In French)

METHANOL
Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992, 17:31315 (R;US)
Reformers for the production of hydrogen from methanol and alternative fuels for fuel cell powered vehicles, 17:31188 (R;US)

METHIONINE
Macro-and micro-autoradiographic study in comparison with the incorporation of ^{35}S-methionine by various tissue protein in organism, 17:31857 (R;CN;In Chinese)

METHYL ALCOHOL
See METHANOL
METHYL IODIDE
Synthesis of tracers using automated radiochemistry and robotics: Progress report, April 1, 1992–July 31, 1992, 17:31331 (R;US)
Volatile organic iodine formation by surface processes, 17:31337 (RA;JP)
METHYL RADICALS
Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)
METHYL-FUEL
See METHANOL
METHYLBENZENE
See TOLUENE
METHYLMERCAPTOAMINOBUTYRIC ACID
See METHIONINE
METHYLTHIOAMINOBUTYRIC ACID
See METHIONINE
METROPOLITAN AREAS
See URBAN AREAS
MHD GENERATOR CFFF
Diagnostic development and support of MHD test facilities: Technical progress report, July–September 1990, 17:31077 (R;US)
MHD GENERATORS
A distributed data acquisition and centralized data reduction system for flexible and efficient measurements, 17:31076 (R;US)
MHD POWER PLANTS
Diagnostic development and support of MHD test facilities: Technical progress report, July–September 1990, 17:31077 (R;US)
MICROBIAL FLORA
See MICROORGANISMS
MICRODOSIMETRY
The application of the distance histogram in microdosimetry for evaluating heterogeneity, 17:31909 (RA;US)
MICROFLORA
See MICROORGANISMS
MICROORGANISMS
See also CYANOBACTERIA
VIRUSES
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
MICROWAVE RADIATION
YBCO based multilayers for optoelectronic devices, 17:31251 (R;FR)
MIGRATION (RADIONUCLIDE)
See RADIONUCLIDE MIGRATION
MILITARY EQUIPMENT
See also ORDNANCE
Human perceptual deficits as factors in computer interface test and evaluation, 17:31623 (R;US)
MILITARY STRATEGY
Nuclear employment policy and optimal exchange strategies, 17:31194 (R;US)
MINE-MOUTH GENERATING PLANTS
See COAL MINES
FOSSIL-FUEL POWER PLANTS
MINERALS
Redox capacity of crystalline rocks - laboratory studies under 100 bar oxygen gas pressure, 17:30751 (R;FI)
The hydrophobic character of nonsulfide mineral surfaces as influenced by double-bond reactions of adsorbed unsaturated collector species: Progress report, 17:31295 (R;US)
MINERS
Alpha Dosimetry
Automatic discrimination and read-out of tracks of RaA and RaC, on CR39 using image analysis, 17:31562 (IA;CA)
Carcinomas
Actual state of the epidemiological study of uranium miners in France, 17:31935 (IA;CA)
Incidence and development of lung cancer due to cigarette smoking and radiation exposure in uranium miners, 17:31942 (IA;CA)
Inherent dosimetric and epidemiological uncertainties associated with lung cancer risk assessment for mining populations, 17:31933 (IA;CA)
Dose Limits
Are the current dose limits for uranium mines too high?, 17:30619 (IA;CA)
Problems in setting and applying limits for occupational exposure to radon daughters, 17:30621 (IA;CA)
The consequences of the latest ICRP recommendations on a revision of Publication 24, 17:30620 (IA;CA)
Dosemeters
The development of track etch dosimeters for measuring radon daughter exposures, 17:31556 (IA;CA)
Mortality
Lung cancer mortality and radiation exposure among the Newfoundland fluorspar miners, 17:31937 (IA;CA)
Mortality experience among workers in the uranium industry, 17:31936 (IA;CA)
Studies of Grants, New Mexico, uranium miners, 17:31939 (IA;CA)
The Ontario miners mortality study 1955-1977: Progress report, 17:31934 (IA;CA)
Update of the United States Public Health Service uranium miners cohort study, 17:31941 (IA;CA)
Occupational Exposure
Impact of occupational hazards on the life expectancy of uranium miners, 17:31940 (IA;CA)
Personnel Dosimetry
A comparison of methods for monitoring miner exposure to radon decay products, 17:31953 (IA;CA)
Comparing personal alpha dosimetry with the conventional area monitoring-time weighting methods of exposure estimation, 17:31946 (IA;CA)
Long term measurements of WL-levels in metal mines by using the ASS-system and HCS-system, 17:31651 (IA;CA)
Progeny
Sex ratio of first-born children of United States uranium miners, 17:31943 (IA;CA)
Radiation Doses
Design for beta radiation protection in the mining and milling of high grade uranium ore, 17:30630 (IA;CA)
Practical approach to retrospective estimation of radon daughter concentration in the underground mining environment, 17:30623 (IA;CA)
Review of gamma and radon daughter exposures of uranium mine workers in 1982 and 1983 in terms of the present and proposed amendments to the AEC regulations, 17:31952 (IA;CA)
Thermoluminescent Dosemeters
The development and field testing of the thermoluminescent personal dosimeter for measuring exposure to radon and thoron daughters, 17:31557 (IA;CA)
MINES
See also ASSE SALT MINE
COAL MINES
URANIUM MINES
A review of all sources of exposure to natural radiation in UK mines, 17:31719 (IA;CA)
Measurements of radon and decay products in non-uranium mines of the Federal Republic of Germany using active and passive methods, 17:31654 (IA;CA)
Non-steady state radiation mine models: Practical applications to personal dosimetry and environmental monitoring, 17:30629 (IA;CA)
Radiation monitoring program in Italian non-uranium mines, 17:31653 (IA;CA)
Research and development of equipments of radon daughters in underground mines, 17:30628 (IA;CA)
MINING
See also SURFACE MINING
Injury experience in stone mining, 1990, 17:30604 (R;US)
MIRRORS
Laser surface profilometer with sub-Angstrom resolution, 17:31610 (R;US)

Mirror alignment techniques for point-focus solar concentrators, 17:30830 (R;US)
Uniformity results of the multilayer mirrors used in the ALEXIS ultrasoft x-ray telescopes, 17:32055 (R;US)
Using a straightness reference in obtaining more accurate surface profiles from a Long Trace Profiler, 17:31516 (R;US)

MIRRORS (MAGNETIC)
See MAGNETIC MIRRORS

MISCIBILITY
See SOLUBILITY

MISGURNUS
See FISHES

MITOGENS
See also GROWTH FACTORS
Enhanced tumor imaging with PokeWeed Mitogen, 17:31820 (RA;US)

MIXING RATIO
Exotic fermion mixing revisited, 17:32149 (R;FR)

MIXTURES
See also SLURRIES
SOLUTIONS
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3, 17:30676 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5, 17:30677 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)

MM-0011
See NICKEL BASE ALLOYS

MODELS (COSMOLOGICAL)
See COSMOLOGICAL MODELS

MODELS (FLOW)
See FLOW MODELS

MODELS (MATHEMATICAL)
See MATHEMATICAL MODELS

MODELS (OPTICAL)
See OPTICAL MODELS

MODELS (PARTICLE)
See PARTICLE MODELS

MODELS (PLASMA)
See PLASMA SIMULATION

MODELS (SHELL)
See SHELL MODELS

MODERATORS
AILMOE: X-section calc elastic scat resonances, 17:32541 (CM;US)
Scintillation counter: Moderator purification, 17:30977 (R;US)

MOLDS
See FUNGI

MOLECULAR BEAMS
14th international symposium on molecular beams, 17:32379 (R;US)

MOLECULAR FLUORESCENCE SPECTROSCOPY
See FLUORESCENCE SPECTROSCOPY

MOLECULAR ORBITAL MODEL
See MOLECULES

MOLECULAR SIEVES
Structure sensitive reactions over Co, Fe and mixed metal clusters in zeolites: Annual technical progress report, 17:31314 (R;US)

MOLECULES
Photochemical dynamics of surface oriented molecules: Progress report, August 1, 1991–July 31, 1992, 17:31323 (R;US)
Rotationally resolved photoionization with coherent VUV radiation, 17:32360 (R;US)

MOLTEN CARBONATE FUEL CELLS
ANL's research and development of alternative components for MCFC's, 17:31078 (R;US)
Impact of protective oxides on cathode-side resistances in MCFCs, 17:31085 (R;US)
MCFC diagnostics: HCl detection, 17:31079 (R;US)
Oxygen electrode reaction in molten carbonate fuel cells: Final report, September 15, 1987–September 14, 1990, 17:31086 (R;US)
Understanding of carbonate fuel cell resistance issues for performance improvement, 17:31084 (R;US)

MOLYBDATES
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)
Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst, 17:30430 (R;US)

MOLYBDENUM
Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991, 17:30448 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991, 17:30447 (R;US)
Silicide layer growth rates in Mo/Si multilayers, 17:31244 (R;US)
Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of $Ru_3(CO)_{12}$ (or $RuCl_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)

MOLYBDENUM 100
Nuclear transparency and double beta decay of molybdenum 100: Annual progress report, March 1, 1992–January 31, 1993, 17:32246 (R;US)

MOLYBDENUM 99
Extraction of molybdenum by the di-n-butyl 2.2.N.hydroxyhexanamide (tri-n-butylacetohydroxamic acid) from aqueous acidic media, 17:31290 (R;FR;In French)

MOLYBDENUM ORES
Multielemental gamma activation analysis of copper-molybdenum ores and its production of processing using microtron, 17:31301 (R;SU;In Russian)

MOLYBDENUM SILICIDES
Ductile phase toughening of molybdenum disilicide by low pressure plasma spraying, 17:31258 (R;US)

MONITORING (BEAM)
See BEAM MONITORING

MONITORING (RADIATION)
See RADIATION MONITORING

MONITORS
See also BEAM MONITORS
RADIATION MONITORS
Optical monitor for observing turbulent flow, 17:31612 (PA;US)

MONITORS (BEAM)
See BEAM MONITORS

MONITORS (RADIATION)
See RADIATION MONITORS

MONITORS (REACTOR)
See REACTOR CONTROL SYSTEMS

MONOCHROMATORS
Emittance, brilliance, and bandpass issues related to an inclined crystal monochromator, 17:31614 (R;US)

MONOCLONAL ANTIBODIES
A novel bifunctional chelating agent α,ϵ-N,N′-bis(L-cysteinyl)-L-lysine for radiolabeling of monoclonal antibodies with technetium-99m, 17:31827 (RA;US)

Behavior of various radiochemical species present in Tc-99m labeled monoclonal antibody preparations, 17:31811 (RA;US)

Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts, 17:31804 (RA;US)

Hepatic uptake of a radiolabeled monoclonal antibody is not receptor-mediated, 17:31803 (RA;US)

I-131 anti-Ama monoclonal antibody for radioimaging of atheromas, 17:31836 (RA;US)

Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated F(ab$'$)$_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8, 17:31832 (RA;US)

Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc, 17:31834 (RA;US)

Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T, 17:31835 (RA;US)

Purification of radiolabeled monoclonal antibodies to angiotensin-converting enzyme significantly improves specificity and efficacy of its targeting into the lung, 17:31788 (RA;US)

Strategies for pharmacokinetic modeling of monoclonal antibody biodistribution in man, 17:31808 (RA;US)

MONOCRYSTALS

Investigation of the neutron diffraction anomaly and electrical behaviour of α-LiIO$_3$ single crystal under AC field, 17:31266 (R;CN;In Chinese)

MONOCYTES

The effects of ^{60}Co γ-ray irradiation on the cytoskeleton of mouse peritoneal macrophages and human peripheral blood monocytes in vitro, 17:31873 (R;CN;In Chinese)

MONTANA

The origin or the Archean Jardine iron formation-hosted lode gold deposit. Montana, 17:32014 (R;US)

MONTE CARLO METHOD

A shortcoming of NITAWL/BONAMI causing problems in KENO calculations, 17:32516 (R;NL)

Monte Carlo simulations in theoretical physic, 17:32018 (R;FR;In French)

MOON

Latent heat thermal energy storage for lunar oxygen production, 17:31042 (R;US)

RATLER: Robotic All-Terrain Lunar Exploration Rover, 17:31365 (R;US)

MOROCCO

Characterization of selected countries, 17:30555 (RA;US)

MORTALITY

Issues in risk assessment and modifications of the NRC health effects models, 17:31998 (R;US)

MTSE DEVICES

See MAGNETIC MIRRORS

MUCOPROTEINS

Targeting of macrophages for the scintigraphic evaluation of inflammatory lesions in a model of radio-induced inflammation in pigs, 17:31769 (R;FR)

MULLITE

Dislocation and pores in mullite from diphasic gels, 17:31273 (R;US)

MULTI-CHANNEL ANALYZERS

Multichannel recorder of transition processes in superconducting magnets, 17:31488 (R;SU;In Russian)

MULTI-ELEMENT ANALYSIS

Basic analysis of sugar cane lead and cane fields of an AIC, 17:31688 (I;CU;In Spanish)

MULTIPARTICLE SPECTROMETERS

Analysis of data from the HYPERON facility in experimental investigation of the inclusive production of K^0 and K^{*0}(892) mesons, 17:31577 (R;SU;In Russian)

MULTIPHASE FLOW

Numerical dispersion reduction by correction of mass flows. Application to the problem of hydrocarbon recovery by chemical processes, 17:30573 (R;FR;In French)

Steady-state cooling of a high-temperature superconducting motor, 17:32392 (R;US)

MULTIPLE PRODUCTION

Finite-size scaling in the multiparticle production, 17:32156 (R;FR)

Intermittency in the limit of a large number of correlated components, 17:32032 (R;SU;In Russian)

MULTIPLE SCATTERING

Running EGS4 on Unix workstations and personal computers, 17:31582 (RA;JP;In Japanese)

MULTIPROCESSING

See PARALLEL PROCESSING

MULTIPROCESSORS

See ARRAY PROCESSORS

MUNITIONS

See ORDNANCE

MUONS

Particle production and survival in muon acceleration, 17:32189 (R;US)

MUSCULAR TISSUE

See TISSUES

MUTAGENESIS

Modification of γ-induced mutagenesis in Ames test-strains: 1. Radioprotector effect on mutagenesis in Salmonella typhimurium, 17:31961 (RA;SU;In Russian)

Modification of γ-induced mutagenesis in Ames test-strains: 2. TAN effect on Salmonella typhimurium mutagenesis, 17:31962 (RA;SU;In Russian)

MUTATION FREQUENCY

Effect of durable γ-radiation on E.Coli, 17:31963 (RA;SU;In Russian)

MUTATIONS

See also CHROMOSOMAL ABERRATIONS
GENOME MUTATIONS

Photoreactivation of γ-induced premutations damages in Drosophila wild and phr$^-$ genotypes, 17:31977 (RA;SU;In Russian)

MYOCARDIUM

Dosimetry of ^{99m}Tc-P53, a new myocardial perfusion imaging agent, 17:31773 (RA;US)

Dynamic PET scanning and compartmental model analysis to determine cellular level radiotracer distribution in vivo, 17:31900 (RA;US)

In vivo distribution and dosimetry of Tc-99m MIBI in man, 17:31906 (RA;US)

N

N*BARYONS

Scaling effects and properties of Δ-isobar resonances, 17:32192 (IA;DE)

N*RESONANCES

See N*BARYONS

NATIONAL INSTITUTE FOR PETROLEUM AND ENERGY RESEARCH

See US NIPER

NATIONAL REACTOR TESTING STATION

See IDAHO NATIONAL ENGINEERING LABORATORY

NATURAL CIRCULATION

See NATURAL CONVECTION

NATURAL CONVECTION

Experimental research on flow resistance in piping components under natural circulation condition, 17:31379 (R;CN;In Chinese)

Investigation on subcold boiling-induced hydrodynamic instability in a natural circulation system, 17:31380 (R;CN;In Chinese)

NATURAL GAS

Alternative automotive fuels in USA. Cost-, supply- and environmental aspects, 17:30585 (R;SE;In Swedish)

Cooperative research on the combustion characteristics of cofired desulfurized Illinois coal and char with natural gas: Technical report, December 1, 1991–February 29, 1992, 17:30551 (R;US)

Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)

Meeting future exhaust emissions standards using natural gas as a vehicle fuel: Lessons learned from the natural gas vehicle challenge '92, 17:31189 (R;US)
Methodological aspects of market study on residential, commercial and industrial sectors, of the Conversion Project for natural gas of existing network in Sao Paulo city, 17:30596 (IA;BR;In Portuguese)
Natural gas participation on brazilian demand supply of liquefied petroleum gas, 17:30597 (IA;BR;In Portuguese)
Pilot plant for sealed gas-storage facility at Graengesberg (Sweden), 17:30598 (R;SE;In Swedish)
Proceedings of the 3. international seminar on natural gas, 17:30595 (I;BR;In Portugese)
Record of proceedings: Conference on state regulation and the market potential for natural gas: Challenges and opportunities, 17:30593 (R;US)
Research needs on the natural gas field in Finland, 17:30592 (R;FI;In Finnish)
Short-term energy outlook: Quarterly projections, Third quarter 1992, 17:31066 (R;US)

NATURAL GAS DEPOSITS
Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)
Natural fracture systems studies, 17:30587 (R;US)
Unconventional gas systems analysis, 17:30590 (R;US)

NATURAL GAS DISTRIBUTION SYSTEMS
Natural gas monthly, July 1992, 17:30594 (R;US)

NATURAL GAS GATHERING SYSTEMS
See NATURAL GAS DISTRIBUTION SYSTEMS

NATURAL GAS INDUSTRY
Natural gas monthly, July 1992, 17:30594 (R;US)
Waste minimization in the oil and gas industries, 17:30578 (R;US)

NATURAL GAS WELLS
Horizontal Devonian shale well, Columbia Natural Resources, Inc.'s, Pocohontas Development Corp. Well 21747, Martin County, Kentucky: Final report, 17:30589 (R;US)
Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)
Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)
Unconventional gas systems analysis, 17:30590 (R;US)

NATURAL URANIUM
Distribution of natural uranium in Jiuquan ecological environment, 17:31689 (R;CN;In Chinese)

NAVAL PETROLEUM RESERVE
See US NAVAL PETROLEUM RESERVES

NEAR INFRARED RADIATION
The hydrophobic character of nonsulfide mineral surfaces as influenced by double-bond reactions of adsorbed unsaturated collector species: Progress report, 17:31295 (R;US)

NEGATONS
See ELECTRONS

NEGATRONS
See ELECTRONS

NEODYMIUM LASERS
Experimental program on the 20 TW laser system, 17:32394 (R;FR)

NEOPLASMS
See also CARCINOMAS
GLIOMAS
^{11}C-thymidine: An in-vivo tracer for cell proliferation, 17:31819 (RA;US)
A Monte Carlo simulation of boron neutron capture reactions in cells - Microdosimetric aspects, 17:31774 (RA;US)
Enhanced tumor imaging with PokeWeed Mitogen, 17:31820 (RA;US)
$Ga(NO_3)_3$ uptake by human-derived small cell lung cancer cells, 17:31789 (RA;US)
Health and dosimetry considerations in the ICRP 1990 formulation of effective dose, 17:31879 (RA;US)
I-131 anti-Ama monoclonal antibody for radioimaging of atheromas, 17:31836 (RA;US)
Intratumoral injection of 5-^{125}I-iodo-2′-deoxyuridine in patients with colon cancer, 17:31817 (RA;US)
Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model, 17:31821 (RA;US)
Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T, 17:31835 (RA;US)
Tumortropic metal-complexes at the crossroads between diagnosis and therapy - A radiopharmacologic reflection, 17:31783 (RA;US)

NEPTUNIUM
Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)

NERVOUS SYSTEM DISEASES
Analysis of [F-18]-L-6-fluorodopa and metabolites in plasma for PET studies, 17:31845 (RA;US)

NETHERLANDS
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

NETWORKS (COMPUTER)
See COMPUTER NETWORKS

NEURAL NETWORKS
Neural network sensor fusion for security applications, 17:31628 (R;US)
Non-US artificial neural network research: FASAC special study, 17:32550 (R;US)

NEUTRINO OSCILLATION
On the problem of enhancement of neutrino oscillation in matter, 17:32165 (R;SU)

NEUTRINOS
Electromagnetic interactions and chirality flip of neutrinos in a thermal background, 17:32199 (R;FR)
Neutrino mass, 17:32202 (R;US)

NEUTRON ACTIVATION ANALYSIS
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)
European Activation File for fusion: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32216 (R;NL)

NEUTRON BEAMS
[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1988, 17:31775 (R;US)
[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1989, 17:31910 (R;US)

NEUTRON CAPTURE
See NEUTRON REACTIONS

NEUTRON CAPTURE THERAPY
Development study of a biological thermal neutron facility for the Petten BNCT project at the LFR, 17:31848 (R;NL)
Heat production by photons in the BNCT beam filter components in HB11 at the HFR, 17:31847 (R;NL)

NEUTRON DETECTION
Detection of neutrons by BaF_2 TAPS modules in relativistic heavy ion collisions, 17:31566 (IA;DE)

NEUTRON DETECTORS
See also HE-3 COUNTERS
Calibration correction factors for the Los Alamos neutron well, 17:31593 (RA;US)
Simulation of high level neutron coincidence counter, 17:30765 (R;US)
The use of ring ratios to detect sample differences in passive neutron counting, 17:30771 (R;US)
Waste crate counter design, 17:30708 (R;US)

NEUTRON DIFFRACTION
12th general conference of the condensed matter division of the E.P.S. V.16A., 17:32372 (I;CS)
Background modelling in Rietveld analysis, 17:31288 (R;US)
Influence of neutron spin orientation on Laue diffraction in a non-centrosymmetric crystal, 17:32380 (R;SU;In Russian)

NEUTRON DIFFUSION EQUATION
A discrete ordinates approximation to the neutron transport equation applied to generalized geometries, 17:30938 (R;US)

GRENADE: 3d multigp diffusion Green's function, 17:32529 (CM;RO)
The early days of the S_n method, 17:32352 (R;US)

NEUTRON DOSIMETRY
JENDL Dosimetry File, 17:32320 (R;JP)
Neutron metrology in the HFR: Steel irradiation R139-6551, 17:32451 (R;NL)
The research on the measuring method and equipment of fast neutron absorption dosimetry and international intercomparison, 17:31544 (R;CN;In Chinese)

NEUTRON ECONOMY
See NEUTRON FLUX

NEUTRON EMISSION
Application of a safeguards radiation measurement system to the screening of spent fuel assemblies for transport and storage, 17:30646 (R;US)
Comparison of double-differential neutron emission cross sections calculated from evaluated nuclear data libraries with experimental data, 17:32462 (R;US)

NEUTRON EVAPORATION
See NEUTRON EMISSION

NEUTRON FLUENCE
Neutron metrology in the HFR: Steel irradiation R139-587/588/589, 17:31226 (R;NL)

NEUTRON FLUX
AILMOE: X-section calc elastic scat resonances, 17:32541 (CM;US)

NEUTRON FLUX DENSITY
See NEUTRON FLUX

NEUTRON GUIDES
Production of the mirror foil for the ultracold neutron guides, 17:32351 (R;SU;In Russian)

NEUTRON MATTER
See NUCLEAR MATTER

NEUTRON REACTIONS
ABAREX: A neutron spherical optical-statistical model code, 17:32271 (R;US)
International evaluation cooperation task 1.1 : intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32284 (R;NL)
JENDL Dosimetry File, 17:32320 (R;JP)
Measurement of formation cross sections of short-lived nuclei by 14 MeV neutrons–F, Mg, Si, Ti, Cr, Ni, Ga, Rb, Sr, Ag, 17:32321 (R;JP)
The pre-equilibrium picture of nucleon radiative capture and the neutron-to-gamma competition: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32283 (R;NL)
The sensitivity of statistical model capture calculations to model assumptions: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32217 (R;NL)

NEUTRON SOURCE FACILITIES
Conceptual design summary, 17:30792 (R;US)
Fuel plate stability experiments and analysis for the Advanced Neutron Source, 17:30973 (R;US)

NEUTRON SOURCES
Analyses of the reflector tank, cold source, and beam tube cooling for ANS reactor, 17:30994 (R;US)
Measurement of the removal sechtion of biological protection concretes in the spectrum of an AmBe source, 17:32343 (I;CU;In Spanish)
Miniature neutron sources: Thermal neutron sources and their users in the academic field, 17:30781 (R;US)

NEUTRON SPECTRA
Neutron spectra in the energy range from 10^{-8} to hundreds of MeV measurement in hard scattered radiation fields, 17:32347 (R;SU;In Russian)

NEUTRON STARS
Are some of the luminous high-latitude stars accretion-powered runaways?, 17:32053 (R;US)
Neutron superfluid dynamics, 17:32057 (R;US)

NEUTRON TRANSPORT
A stochastic/deterministic method for transient, three-dimensional neutron transport, 17:32353 (R;US)
REMP1-PC computer code for optimization of radiation shields characteristics, 17:32344 (R;SU;In Russian)

NEUTRON TRANSPORT THEORY
A discrete ordinates approximation to the neutron transport equation applied to generalized geometries, 17:30938 (R;US)
APARNA2: 1-d integral neutron transport slab, 17:32531 (CM;IN)

NEUTRON-DEFICIENT ISOTOPES
Description of the Gamow-Teller β^+-decays and (n,p) transitions in spherical nuclei, 17:32250 (R;SU)

NEUTRON-RICH ISOTOPES
New mass measurements of neutron-rich nuclei near N=20*, 17:32234 (R;SU)

NEUTRONS
See also COLD NEUTRONS
FAST NEUTRONS
Irradiation techniques employed at the 10 MW_{th} SAPHIR reactor, 17:30995 (R;CH)
On different values of the neutron-electron scattering amplitude and neutron mean square charge radius obtained from the low-energy dependence of the scattering amplitude, 17:32325 (R;SU)
SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)
The technology and application study of NTD CZ silicon for pressure sensing elements, 17:31602 (R;CN;In Chinese)

NEVADA TEST SITE
Hydrology and Radionuclide Migration Program: 1989 progress report, 17:31746 (R;US)

NEW MEXICO
Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)
Prospects for the commercial development of hot dry rock geothermal energy in New Mexico, 17:30838 (R;US)

NEWTON MECHANICS
See CLASSICAL MECHANICS

NEWTON METHOD
On a modification of a continuous analog of the Newton method, 17:32036 (R;SU;In Russian)

NICKEL
Influence of dilute impurities on the evolution of defect cascades in nickel, 17:31201 (R;US)
Low energy helium implantation in evaporated nickel surfaces, 17:32470 (R;US)
Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991, 17:31270 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, January–March 1991, 17:30449 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, July–September 1990, 17:30451 (R;US)
Microbial recovery of metals from spent catalysts: Quarterly report, September–December 1990, 17:30450 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, July–September 1991, 17:30447 (R;US)
Microbial recovery of metals from spent coal liquefaction catalysts: Quarterly report, April–June 1991, 17:30448 (R;US)
Nickel plating of flexible products: Statistical optimization, 17:31414 (R;US)
The electronic structure of core states under extreme compressions, 17:32364 (R;US)
Wastage-resistant FBC evaporator tubing through microalloying, 17:31223 (R;US)

NICKEL 58
International evaluation cooperation task 1.1 : intercomparison of evaluated files for ^{52}Cr, ^{56}Fe, and ^{58}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32284 (R;NL)

NICKEL 58 TARGET
The EFF-2 evaluation for the reaction systems n + ^{52}Cr, ^{56}Fe, ^{58}Ni and ^{60}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32282 (R;NL)

NICKEL 60 TARGET
The EFF-2 evaluation for the reaction systems n + ^{52}Cr, ^{56}Fe, ^{58}Ni and ^{60}Ni: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32282 (R;NL)

NICKEL 63
Flowsheet for ^{63}Ni production, 17:31330 (R;US)

NICKEL ALLOYS
See also NICKEL BASE ALLOYS
A study of the vacancy loop formation probability in Ni-Cu and Ag-Pd alloys, 17:31202 (R;US)
Summary of the 12th study meeting of hydrogen energy system, 17:30794 (I;JP;In Japanese)
Weak-beam imaging of dissociated dislocations in HVEM-irradiated Fe-Ni-Cr alloys, 17:31200 (R;US)

NICKEL BASE ALLOYS
Influence of dilute impurities on the evolution of defect cascades in nickel, 17:31201 (R;US)
Ordering energies and mechanisms in β-phase NiAl, 17:31215 (R;US)

NICKEL IODIDES
Infrared spectra of the gaseous iodides of chromium, iron and nickel, 17:31227 (R;NL)

NIOBIUM COMPOUNDS
Ac losses test on Nb$_3$Sn strands, 17:32388 (R;NL)

NIPER
See US NIPER

NITRIC OXIDE
Binding and catalytic reduction of NO by transition metal aluminosilicates: Technical progress report, March 1992–May 1992, 17:30483 (R;US)
Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)

NITROGEN
Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)

NITROGEN IONS
Oscillator strengths for transition among low-lying quartet terms in the nitrogen isoelectronic sequence, 17:32238 (R;NO)

NITROGEN NITRIDES
See NITROGEN

NITROGEN OXIDES
See also NITRIC OXIDE
NITROUS OXIDE
A preliminary study of the effect of equivalence ratio on a low emissions gas turbine combustor using KIVA-II, 17:30866 (R;US)
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly technical progress report, 14 October 1989–14 January 1990, 17:31155 (R;US)
Emissions of nitrogen oxides in Finland in the 1980s and 1990s, 17:31682 (R;FI;In Finnish)
Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988, 17:30544 (R;US)
Low NO$_x$/SO$_x$ Burner retrofit for utility cyclone boilers: Public design report, 17:30545 (R;US)
The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly status report No. 7, January 15, 1989–April 15, 1989], 17:31152 (R;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Sixth quarterly progress report, October 15, 1988–January 15, 1989], 17:31151 (R;US)

NITROUS OXIDE
A correlated K-distribution model of the heating rates for CH$_4$ and N$_2$O in the atmosphere between 0 and 60 km, 17:31676 (R;US)

NON-DISPERSIVE ION WAVES
See ION ACOUSTIC WAVES

NON-PROLIFERATION TREATY
The Strategic Arms Reduction Treaty and its verification: Report No. 12, 17:31192 (R;US)

NONAXIAL NUCLEI
See DEFORMED NUCLEI

NONDESTRUCTIVE ANALYSIS
See also PROTON MICROPROBE ANALYSIS
The in-plant evaluation of a uranium NDA system, 17:30768 (R;US)

NONDESTRUCTIVE TESTING
Review of progress in quantitative NDE: Abstracts, 17:31404 (R;US)

NONLINEAR PROBLEMS
Studies in nonlinear problems of energy: Progress report, January 1, 1992–December 31, 1992, 17:31345 (R;US)

NONLINEAR SYSTEMS
See NONLINEAR PROBLEMS

NORTH SEA
The conditions of the seas around Sweden: Report from the activities in 1991, 17:31756 (R;SE;In Swedish, English)

NORTHERN IRELAND
See UNITED KINGDOM

NORWAY
Petroleum taxation and the incentives for exploration and development, 17:30575 (R;NO)

NORWEGIAN ORGANIZATIONS
Institutt for Energiteknikk - Annual report 1991, 17:32493 (I;NO)

NOVA FACILITY
Recent Nova experimental results, 17:32478 (R;US)

NOVAE
^{22}Na and ^{26}Al production in nova outbursts, 17:32060 (R;US)
Nucleosynthesis in nova explosions, 17:32059 (R;US)
Ultraviolet studies of novae in the large magellanic cloud, 17:32058 (R;US)

NOVO VORONEZH-3 REACTOR
See WWER-3 REACTOR

NOXSO PROCESS
Technology descriptions and demonstrations, 17:30419 (RA;US)

NOZZLES
Interim report - Production Test MR-105-12 crossheader purge with chromic acid, 17:30986 (R;US)
Manufacturing technology of top nozzle and bottom nozzle in fuel assembly for nuclear power plant, 17:30883 (R;CN;In Chinese)

NRTS
See IDAHO NATIONAL ENGINEERING LABORATORY

NSRR REACTOR
Annual progress report on the NSRR experiments, 20: January 1988 through March 1989, 17:30992 (R;JP;In Japanese)
Pre-pulse irradiation examination, NSRR pulse irradiation and post-pulse irradiation examination of MH-2 fuel rod, 17:30896 (R;JP;In Japanese, English)

NUCLEAR ACCIDENTS
See ACCIDENTS

NUCLEAR ATTACKS
See NUCLEAR WEAPONS

NUCLEAR CONTROVERSY
See HUMAN POPULATIONS

NUCLEAR DAMAGE
The environmental effects of the nuclear accidents in Chernobylsk (1986) and in the Ural mountains, 17:30965 (RA;IL;In Hebrew)

NUCLEAR DATA COLLECTIONS
Communication of nuclear data progress: No.4(1990), 17:32204 (R;CN)
European Activation File for fusion: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:32216 (R;NL)
Proceedings of the 1991 symposium on nuclear data, 17:32210 (R;JP)

Proceedings of the specialists' meeting on high energy nuclear data, 17:32211 (R;US)
Short status report on EFF and EAF projects: Presented at the Topical Conference on Nuclear Data for Fusion Reactor Technology, NEANDC Meeting, Karlsruhe, October 22, 1991, 17:32453 (R;NL)

NUCLEAR EXPLOSIONS
See also THERMONUCLEAR EXPLOSIONS
Sensitivities of calculated residual stress to separation distances of two simultaneous events, 17:31641 (R;US)

NUCLEAR EXPLOSIVES
Automated dry powder dispenser for explosive components, 17:31640 (R;US)
Automated weapon disassembly, 17:31364 (R;US)

NUCLEAR FACILITIES
See also FUEL REPROCESSING PLANTS
NUCLEAR POWER PLANTS
RADIOACTIVE WASTE FACILITIES
SURPLUS NUCLEAR FACILITIES
A graded approach to safety documentation at processing facilities, 17:30764 (R;US)
Nuclear Security Systems Center, 17:30775 (R;US)

NUCLEAR FRAGMENTATION
Intermittency in the particle production and in the nuclear multifragmentation, 17:32132 (R;FR)
Measurement and analysis of charge partitions in nuclear disassembly, 17:32268 (R;FR)

NUCLEAR FRAGMENTS
See also HYPERNUCLEI
Finite size effects in the intermittency analysis of the fragment-size correlations, 17:32252 (R;FR)
Statistical emission of complex fragments from highly excited compound nucleus, 17:32279 (R;FR)

NUCLEAR FUEL ELEMENTS
See FUEL ELEMENTS

NUCLEAR FUELS
See also ALLOY NUCLEAR FUELS
SPENT FUELS
A new apparatus for continuous countercurrent flow of solids and liquids, 17:31124 (R;US)
Fuels Preparation Department monthly report, August 1960, 17:30988 (R;US)
ICPP custom dissolver explosion recovery, 17:30763 (R;US)
Simulation of liquid drop breakup behavior in a flow field using discrete element techniques, 17:31401 (R;US)

NUCLEAR INDUSTRY
Communicating science and energy in public-lessons from the real world, 17:31063 (R;US)
Radiological environmental quality assessment of the nuclear industry in China over the past 30 years, 17:30964 (R;CN;In Chinese)

NUCLEAR MATERIALS MANAGEMENT
An integrated methodology for sabotage vulnerability assessment, 17:30777 (R;US)

NUCLEAR MATTER
Coupling and decoupling of pions and deltas in nuclear matter, 17:32225 (IA;DE)
Hadronic gas models and equilibration in heavy ion collisions, 17:32295 (IA;DE)
Heavy-ion collisions and the nuclear equation of state: Progress report, August 15, 1991–March 1992, 17:32281 (R;US)
Kaon condensation in dense hadronic matter, 17:32227 (IA;DE)
Modifications of scalar and vector mesons in nuclear matter, 17:32226 (IA;DE)
Nuclear physics of hot dense matter, 17:32229 (R;FR)
Nucleus as a canonical ensemble, 17:32222 (IA;DE)
Phase-transitions in nuclear matter: Deconfinement of quarks and gluons?, 17:32220 (IA;DE)
Properties of the ρ-meson in dense nuclear matter, 17:32224 (IA;DE)
Response functions for infinite fermion systems with velocity dependent interactions, 17:32230 (R;FR)
The K^+ as a probe of nuclear medium effects, 17:32273 (R;US)
The modification of hadrons propagating in dense media, 17:32186 (R;FR)
The surface compression of nuclei in relativistic mean-field approach, 17:32232 (R;FR)
Two-loop corrections for nuclear matter in the Walecka model with form factors, 17:32223 (IA;DE)

NUCLEAR MEDICINE
National standards for diagnostic and therapeutic nuclides, 17:31884 (RA;US)
Use of a model for 3D image reconstruction, 17:31770 (R;FR;In French)

NUCLEAR PHYSICS
Department of Theoretical Physics. Annual Report 1989, 17:32209 (R;PL)
Experimental Medium Energy Physics: Annual progress report, June 1991–May 1992, 17:32067 (R;US)
North American radioactive beam initiatives, 17:31430 (R;US)
Section for nuclear physics and energy physics - Annual Report: January 1 - December 31, 1991, 17:32496 (R;NO)

NUCLEAR POWER
Nuclear power - status and development 1991/1992, 17:30925 (R;NO;In Norwegian)
What role can nuclear power play in mitigating global warming?, 17:32494 (R;SE)

NUCLEAR POWER PLANTS
Borssele Reactor
Studies on signal validation and sensor surveillance for in-core signals in NPP: Paper presented at the NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburg, Pennsylvania, USA, 1-4 October 1991, 17:30961 (R;NL)
Computerized Control Systems
Advanced control room design review guidelines: Merging old and new, 17:30956 (R;US)
Installation and evaluation of a nuclear power plant operator advisor based on artificial intelligence technology: Interim progress report and second year development plan, 17:30957 (R;US)
Containment Systems
Proceedings of the fifth workshop on containment integrity, 17:31018 (R;US)
Data
World nuclear power plant capacity, 17:31048 (I;DE)
Emergency Plans
Emergency Response Resources guide for nuclear power plant emergencies: Revision 1, 17:31016 (R;US)
Meltdown
Gas blowthrough and flow quality correlations for use in the analysis of high pressure melt ejection (HPME) events, 17:31030 (R;US)
Planning
World nuclear power plant capacity, 17:31048 (I;DE)
Public Opinion
Communicating science and energy in public-lessons from the real world, 17:31063 (R;US)
Reactor Accidents
Organizational culture during the accident response process, 17:31000 (R;US)
Resources available for nuclear power plant emergencies under the Price-Anderson Act and the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 17:31017 (R;US)
Reactor Components
A survey of fatigue monitoring in the nuclear power industry, 17:30941 (R;US)
Reactor Control Systems
Studies on signal validation and sensor surveillance for in-core signals in NPP: Paper presented at the NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburg, Pennsylvania, USA, 1-4 October 1991, 17:30961 (R;NL)
Reactor Monitoring Systems
Radiation monitor system for nuclear power plants, 17:30955 (R;CN;In Chinese)
Reactor Operation
World nuclear power plant capacity, 17:31048 (I;DE)

Reactor Safety
Failure detection studies by layered neural network, 17:30959 (R;NL)
Risk Assessment
Aging data analysis and risk assessment: Development and demonstration study, 17:31024 (R;US)
Workshop on the use of PRA methodology for the analysis of reactor events and operational data: Proceedings, 17:31019 (R;US)
Safety
Report on the activities of the Czechoslovak Atomic Energy Commission in performing its function of State Surveillance over Nuclear Safety of Nuclear Facilities in 1991, 17:30892 (I;CS;In Czech)
Service Life
ASTM international symposium on small specimen test techniques and their applications to pressure vessel annealing and plant life extension, 17:30948 (R;US)
Valves
Aging and service wear of solenoid-operated valves used in safety systems of nuclear power plants: Volume 2, Evaluation of monitoring methods, 17:30947 (R;US)
NUCLEAR POWER STATIONS
See NUCLEAR POWER PLANTS
NUCLEAR REACTION KINETICS
Inclusion of fluctuations in BUU nuclear dynamics, 17:32254 (IA;DE)
N-body collisions in high-energy nuclear reactions, 17:32298 (IA;DE)
Relativistic transport equations from quantum field theory, 17:32255 (IA;DE)
NUCLEAR REACTIONS
See also COLD FUSION
HEAVY ION FUSION REACTIONS
NUCLEAR FRAGMENTATION
PHOTONUCLEAR REACTIONS
SPALLATION
THERMONUCLEAR REACTIONS
Comprehensive nuclear model calculations: Introduction to the theory and use of the GNASH code, 17:32269 (R;US)
NUCLEAR REACTORS
See REACTORS
NUCLEAR SAFETY
See RADIATION PROTECTION
NUCLEAR SAFETY RESEARCH REACTOR (JAPAN)
See NSRR REACTOR
NUCLEAR STRUCTURE
Towards superdeformation in the quasicontinuum: microscopic view of the excited superdeformed bands and the corresponding level densities, 17:32214 (R;FR)
'Local' EMC effects and the J/ψ suppression, 17:32221 (IA;DE)
NUCLEAR THEORY
Institute for Nuclear Theory [annual report]: Program 6, Mesons and fields in nuclei, 30 September 1991–31 January 1992; Program 7, Fundamental interactions in nuclei, 1 February 1992–31 May 1992: Final report, 17:32207 (R;US)
Institute for Nuclear Theory annual report No. 2, 1 March 1991–29 February 1992, 17:32208 (R;US)
Investigations of the structure and electromagnetic interactions of few-body systems: Progress report, 1 August 1991–31 July 1992, 17:32205 (R;US)
Theoretical nuclear physics: Progress report, October 1, 1991–August 1, 1992, 17:32206 (R;US)
NUCLEAR TRADE
Communications received from certain Member States regarding guidelines for the export of nuclear material, equipment and technology: Nuclear-related Dual-use Transfers, 17:30766 (R;XA)
NUCLEAR TRANSMUTATION
See TRANSMUTATION
NUCLEAR WASTES
See RADIOACTIVE WASTES
NUCLEAR WEAPON TESTS
See NUCLEAR EXPLOSIONS
NUCLEAR WEAPONS
Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth, 17:30761 (RA;US)
Automated weapon disassembly, 17:31364 (R;US)
Space nonweaponization. An urgent task for arms control, 17:31191 (R;CN;In Chinese)
Supercritical CO_2 cleaning for waste minimization, 17:31638 (R;US)
The Strategic Arms Reduction Treaty and its verification: Report No. 12, 17:31192 (R;US)
Transportation Systems Center, 17:30647 (R;US)
NUCLEI
See also DEFORMED NUCLEI
HEAVY NUCLEI
HYPERNUCLEI
The partial beam lifetime at RHIC due to Coulomb dissociation of the nucleus, 17:31448 (R;US)
NUCLEI (CELLS)
See CELL NUCLEI
NUCLEOGENESIS
See NUCLEOSYNTHESIS
NUCLEON ISOBARS
See N*BARYONS
NUCLEON REACTIONS
See also NEUTRON REACTIONS
PROTON REACTIONS
Analysis of discrete ambiguities for $\pi N \Delta$ and $\rho N \Delta$ vertex functions using inclusive charge-exchange reactions, 17:32256 (IA;DE)
Total cross sections for the $PP\pi$ deg channel in the inelastic PP interaction, 17:32317 (R;FR)
NUCLEON-ANTINUCLEON INTERACTIONS
Some open issues in nucleon-antinucleon interaction, 17:32164 (R;FR)
NUCLEON-NUCLEON INTERACTIONS
Dynamical simulation of quark systems within a covariant transport approach, 17:32160 (IA;DE)
On $NN \rightarrow \Delta N$ transition: Bohr's rules and optimal formalism, 17:32163 (R;FR)
NUCLEONS
See also NEUTRONS
PROTONS
Electromagnetic excitation of nucleon resonances, 17:32151 (R;US)
Nucleon recoil polarization in quasi-elastic electron scattering with two-body currents, 17:32264 (RA;FR)
The spin of the nucleon in deep inelastic lepton scattering experiments, 17:32188 (R;US)
Weak probes and the Gottfried sum rule, 17:32134 (R;XA)
NUCLEOSYNTHESIS
See also THERMONUCLEAR REACTIONS
Experimental observation of neutron emission insaturation of titanium chips with gaseous deuterium, 17:32431 (R;SU)
NUMBER CODES
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

O

O-RINGS
See GASKETS
OAK RIDGE NATIONAL LABORATORY
See ORNL
OCCUPATIONAL EXPOSURE
Occupational radiation exposure and mortality study: Internal linkage of the Canadian National Dose Registry, 17:31922 (R;CA)
OCEANS
See SEAS
OFF-GAS SYSTEMS
Spray nozzle pattern test for the DWPF HEME task technical plan (Defense Waste Processing Facility (DWPF), High-Efficiency Mist Eliminators (HEME)), 17:30744 (R;US)

OFFSPRINGS
See PROGENY
OHIO
Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)
OIL FIELDS
Research on improved and enhanced oil recovery in Illinois through reservoir characterization, March 28, 1992–June 28, 1992, 17:30566 (R;US)
OIL SAND OILS
See BITUMENS
OIL SHALE WASTE WATER
See OIL SHALES
WASTE WATER
OIL SHALES
HRS pilot plant and modeling results, 17:30601 (R;US)
Oil shale ash-layer thickness and char combustion kinetics, 17:30602 (R;US)
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 1, Task 1, PFH scoping studies and Task 2, PFH optimization studies: Final report, September 1987–May 1991, 17:30599 (R;US)
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991, 17:30600 (R;US)
OIL SPILL FINGERPRINTING
See OIL SPILLS
PATTERN RECOGNITION
OIL SPILLS
Research program on the biological effects of oil pollution: Final report, 17:30581 (R;NO;In Norwegian)
OIL WELLS
A pore-level scenario for the development of mixed-wettability in oil reservoirs, 17:30571 (R;US)
Research on improved and enhanced oil recovery in Illinois through reservoir characterization, March 28, 1992–June 28, 1992, 17:30566 (R;US)
The validation of horizontal well models using a physical model of heat flow in an anisotropic conductor, 17:30572 (R;US)
OILS
Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Supercritical CO$_2$ cleaning for waste minimization, 17:31638 (R;US)
OLIGONUCLEOTIDES
Electron migration in 5-bromouracil-substituted DNA and oligonucleotides in irradiated aqueous solutions, 17:31996 (R;US)
Mapping histone4 mRNA in pig brain with In-111 labeled antisense oligo-nucleotide by in-situ hybridization, 17:31801 (RA;US)
Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model, 17:31821 (RA;US)
OMEGA-1778 RESONANCES
See MESONS
ON-LINE COMPUTERS
See COMPUTERS
ON-LINE CONTROL SYSTEMS
See also COMPUTERIZED CONTROL SYSTEMS
A system for experiments automation on the neutron diffractometer DN-2 at the pulsed reactor IBR-2, 17:31578 (R;SU;In Russian)
On-line process control monitoring system, 17:31306 (PA;US)
On-line system for selection and measurement of currents in magnetic elements of beam lines at the JINR phasotron, 17:31434 (R;SU;In Russian)
ON-LINE MEASUREMENT SYSTEMS
A system for experiments automation on the neutron diffractometer DN-2 at the pulsed reactor IBR-2, 17:31578 (R;SU;In Russian)
OPERATORS(QUANTUM FIELD THEORY)
See QUANTUM OPERATORS
OPERATORS(QUANTUM MECHANICAL)
See QUANTUM OPERATORS
OPTICAL MODELS
Isobar contributions to the imaginary part of the optical-model potential for finite nuclei, 17:32270 (R;NO)
OPTICAL SCANNERS
Laser surface profilometer with sub-Angstrom resolution, 17:31610 (R;US)
OPTICAL SYSTEMS
Inverse meso-optics and its potential applications, 17:31569 (R;SU)
ORDNANCE
Hot-wire vs laser, is there a difference?, 17:31633 (R;US)
ORE PROCESSING
Estimation of population expected exposure as a result of mining in Sde Zohar field, 17:31665 (R;IL;In Hebrew)
ORE RESERVES
See RESERVES
ORGANIC ARSENIC COMPOUNDS
Radioarsenic labeled compounds: Synthesis and biological evaluation for potential application in nuclear imaging and therapy, 17:31772 (RA;US)
ORGANIC CHLORINE COMPOUNDS
See also CHLORINATED ALIPHATIC HYDROCARBONS
CHLORINATED AROMATIC HYDROCARBONS
CHLOROFLUOROCARBONS
Characterization and monitoring of total organic chloride vapors, 17:31307 (R;US)
Preliminary feasibility and cost analysis of the in-situ microbial filter concept, 17:30734 (R;US)
ORGANIC COMPOUNDS
See also HYDROCARBONS
ORGANIC ARSENIC COMPOUNDS
ORGANIC NITROGEN COMPOUNDS
ORGANIC SULFUR COMPOUNDS
PROTEINS
A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)
A quantitative method to detect explosives and other selected semivolatiles in soil samples by Fourier transform infrared spectroscopy, 17:31686 (R;US)
Analysis of IMS spectra using neural networks, 17:31318 (R;US)
Effects of lag and maximum growth in contaminant transport and biodegradation modeling, 17:31727 (R;US)
Total destruction of organic compounds in aqueous wastes by a UV/H$_2$O$_2$ process, 17:30738 (R;US)
ORGANIC MATTER
See also PEAT
Electrochemical oxidation of organic materials, 17:31141 (PA;US)
ORGANIC NITROGEN COMPOUNDS
Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of Ru$_3$(CO)$_{12}$ (or RuCl$_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)
[National Institute for Petroleum and Energy Research] monthly progress report for June 1992, 17:30574 (R;US)
ORGANIC SULFUR COMPOUNDS
See also METHIONINE
POLYCYCLIC SULFUR HETEROCYCLES
Applications of micellar enzymology to clean coal technology: Tenth quarterly report, 17:30438 (R;US)
Sulfur removal from high-sulfur Illinois coal by low-temperature perchloroethylene (PCE) extraction: Technical report, December 1, 1991–February 29, 1992, 17:30458 (R;US)
ORGANIC WASTES
Electrochemical oxidation of organic materials, 17:31141 (PA;US)
ORGANS
See also BLOOD VESSELS
BONE MARROW
BRAIN
HEART
INTESTINES
KIDNEYS
LUNGS

SKELETON
SKIN
Dosimetry of intrathecally administered radiopharmaceuticals, 17:31887 (RA;US)
Reevaluation of S-values considering electron transport, 17:31893 (RA;US)

ORIENTATION (GRAIN)
See GRAIN ORIENTATION

ORNL
Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)

ORYZA
See RICE

OSLO CYCLOTRON
SIRI - A proposal for a multi-detector ΔE-E particle telescope, 17:31599 (R;NO)

OUTER CONTINENTAL SHELF
See CONTINENTAL SHELF

OVARIES
Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T, 17:31835 (RA;US)

OXETANE
See ETHERS

OXIDATION
See also COMBUSTION
A new method for residual stress distribution - analysis of corroded zircaloy-4 cladding, 17:31208 (R;FR)
Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992, 17:31315 (R;US)

OXYGEN
An NMR study of the occupation of C_{60} interstitial sites by oxygen molecules, 17:32374 (R;US)
Flash photolysis-shock tube studies of biomolecular reactions, 17:31343 (R;US)
Latent heat thermal energy storage for lunar oxygen production, 17:31042 (R;US)
Oxygen concentration measurements using the ESR line modification of PcLi molecules, 17:31289 (R;FR)
Oxygen diffusion in high-$T_c$superconductors, 17:31246 (R;US)
Study of high energy ion implantation of boron and oxygen in silicon, 17:32376 (R;FR;In French)

OXYGEN EFFECT (RADIOBIOLOGY)
See OXYGEN

OXYGEN HYDRIDES
See WATER

OXYSULFIDES
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, June 1, 1991–August 31, 1991, 17:30479 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991, 17:30480 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991, 17:30478 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990, 17:30482 (R;US)

OZONE
Measurements of total ozone, 17:31671 (R;SE)

P

P CODES
PMAS4.0: Performance Measurement Analysis System, 17:32520 (CM;US)
PROGLOOK: User program performance monitor, 17:32540 (CM;US)

P REACTOR
Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)

P WAVES (SEISMIC)
See SEISMIC P WAVES

PAKISTAN
Characterization of selected countries, 17:30555 (RA;US)

PALEONTOLOGY
Boron-isotope composition of modern biogenic carbonates: A potential new tracer for palaeoenvironments, 17:31706 (IA;IL)

PALIMPINON GEOTHERMAL FIELD
Stanford Geothermal Program [quarterly technical report, January–March 1991], 17:30847 (R;US)

PANTEX PLANT
Security enhancement subproject: Protected area guard towers: Final environmental assessment, 17:31693 (R;US)

PAPER
Modelling of intraweb heat and mass transfer - a literature review, 17:31134 (R;SE)

PAPER CHROMATOGRAPHY
See CHROMATOGRAPHY

PAPER INDUSTRY
Energy savings with combination dryer, 17:31136 (R;FI;In Finnish)
Optimization of the heat recovery system of a paper machine, 17:31123 (R;FI)

PARALLEL PROCESSING
Speedup properties of phases in the execution profile of distributed parallel programs, 17:32558 (R;US)

PARAMAGNETIC RESONANCE (ELECTRON)
See ELECTRON SPIN RESONANCE

PARASITIC DISEASES
Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990, 17:31860 (R;XA)

PARTICLE BOOSTERS
Frequency spectrum generated by AGS Booster power swing, heavy ion cycle, 17:31481 (R;US)
Operational status of the AGS Booster Main Ring Magnet Power Supply, 17:31477 (R;US)
The operational status of the Booster injector for the AGS accelerator complex at BNL, 17:31476 (R;US)

PARTICLE INTERACTIONS
See also ELECTROPRODUCTION
HADRON-HADRON INTERACTIONS
PHOTON-PHOTON INTERACTIONS
PHOTOPRODUCTION
Department of Theoretical Physics. Annual Report 1989, 17:32209 (R;PL)

PARTICLE MODELS
See also HIGGS MODEL
SIGMA MODEL
Does the quantization of a particle with curvature lead to the Dirac equation, 17:32092 (R;SU)
Skyrmions of different types, 17:32130 (R;CN;In Chinese)

PARTICLE PRODUCTION
See also ELECTROPRODUCTION
MULTIPLE PRODUCTION
PHOTOPRODUCTION
Fragmentation in the string-flux tube model, 17:32095 (IA;DE)
Intermittency in the particle production and in the nuclear multifragmentation, 17:32132 (R;FR)
Meson physics at Saturne, 17:32162 (R;FR)

PARTICLE TRACKS
The technique for measuring of the dip angle of the straight particle tracks in the nuclear emulsion by means of the meso-optical Fourier transform microscope, 17:31567 (R;SU;In Russian)

PARTICULATES
A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly

technical progress report, 14 October 1989–14 January 1990, 17:31155 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: First quarterly report, February 1987, 17:30548 (R;US)
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
On development of a three-dimensional particle motion tracking system, 17:30534 (R;US)
Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport: Quarterly technical progress report, March 15, 1992–June 14, 1992, 17:30550 (R;US)
Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows, 17:31383 (RA;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Quarterly status report No. 7, January 15, 1989–April 15, 1989], 17:31152 (R;US)
[A study of the interaction of the flow field and the fuel jet in particulate formation as related to diesel engines: Sixth quarterly progress report, October 15, 1988–January 15, 1989], 17:31151 (R;US)

PARTITION CHROMATOGRAPHY
See CHROMATOGRAPHY

PATIENTS
Effective dose to the patient from radiopharmaceuticals calculated with the new ICRP tissue weighting factors, 17:31880 (RA;US)
Patients protection during diagnosis and therapy with ionizing radiation: ICRO recommendations, 17:31929 (RA;IL;In Hebrew)

PATTERN RECOGNITION
Artificial intelligence and neural networks applied to ion mobility spectrometry, 17:31304 (R;US)

PEACH BOTTOM-1 REACTOR
Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)
Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B, Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, S, 17:30902 (R;US)

PEAT
Boilers
The corrosion on the surfaces of airpreheaters and electrostatic precipitators in peat-fired boilers, 17:30553 (R;FI;In Finnish)
Resource Assessment
Inventory of mires and peat resources in Simo. Part 2, 17:30509 (R;FI;In Finnish)
Inventory of mires and peat resources, Parkano, Western Finland. Part 1, 17:30504 (R;FI;In Finnish)
The mires and peat resources of the commune of Isokyroe and their potential use. Part 1, 17:30498 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 7, 17:30497 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 9, 17:30516 (R;FI;In Finnish)
The mires and peat resources of the commune of Pudasjaervi and their potential use. Part 8, 17:30510 (R;FI;In Finnish)
The mires and peat resources of the commune of Simo in 1985-1986 and their potential use, 17:30500 (R;FI;In Finnish)
The mires and peat resources of the commune of Suonenjoki and their potential use, 17:30490 (R;FI;In Finnish)
The mires and peat resources of the commune of Utajaervi and their potential use. Part 5, 17:30511 (R;FI;In Finnish)
The mires and peat resources of the commune of Utajaervi and their potential use. Part 4, 17:30499 (R;FI;In Finnish)
The mires and their peat resources in Jaeppilae: Part 2 and summary, 17:30494 (R;FI;In Finnish)
The mires and their peat resources in Liminka, Lumijoki and Temmes, 17:30507 (R;FI;In Finnish)
The mires and their peat resources in Nilsiae, 17:30505 (R;FI;In Finnish)
The mires and their peat resources in Oulainen, 17:30489 (R;FI;In Finnish)
The mires and their peat resources in Outokumpu. Part 1, 17:30508 (R;FI;In Finnish)
The mires and their potentialities in peat production in the municipality of Ilomantsi, 17:30513 (R;FI;In Finnish)
The mires and their resources in Kiuruvesi, 17:30492 (R;FI;In Finnish)
The peat recources of Ylaemaa and their usefulness, 17:30501 (R;FI;In Finnish)
The peat resources and their potential use in Kihnioe, Western Finland, 17:30506 (R;FI;In Finnish)
The peat resources of Aehtaeri and their potential use. Part 1, 17:30495 (R;FI;In Finnish)
The peat resources of Aehtaeri and their potential use. Part 2, 17:30517 (R;FI;In Finnish)
The peat resources of Hankasalmi and their usefulness. Part 1, 17:30502 (R;FI;In Finnish)
The peat resources of Kuortane and their potential use, 17:30512 (R;FI;In Finnish)
The peat resources of Miehikkaelae and their usefulness, 17:30487 (R;FI;In Finnish)
The peat resources of Toeysae and their potential use, 17:30515 (R;FI;In Finnish)
The peat resources of seven peat deposits in the commune of Lestijaervi in Western Finland, 17:30493 (R;FI;In Finnish)
The peat resources of seventeen peat deposits in the commune of Kannonkoski in Central Finland, 17:30514 (R;FI;In Finnish)
The peat resources of seventeen peat deposits in the commune of Reisjaervi in Western Finland, 17:30503 (R;FI;In Finnish)
The peat resources of the municipality of Ilomantsi and their potentialities in fuel peat production. Part 1, 17:30496 (R;FI;In Finnish)
The peat resources of the municipality of Juuka and their potentialities in fuel peat production. Part 1, 17:30488 (R;FI;In Finnish)
Utilization of ADP in peat inventory and research, 17:30491 (R;FI;In Finnish)

PEATLANDS
See WETLANDS

PELLET INJECTION
Determination of the safety factor profile in Tore Supra from striations observed during pellet ablation, 17:32458 (R;FR)

PELLETS (BREEDING)
See BREEDING PELLETS

PELLETS (FUEL)
See FUEL PELLETS

PENNING ION SOURCES
Suppression of the e^- coextracted from a Penning surface-plasma H^- source, 17:31509 (R;US)

PENTAERYTHRITOL TETRANITRATE
See PETN

PEOPLE
See HUMAN POPULATIONS

PEOPLES REPUBLIC OF CHINA
See CHINA

PEP STORAGE RINGS
Optimizing the injection straight of PEP II asymmetric B Factory at SLAC, 17:31522 (R;US)

PEPTIDES
Capillary electrophoresis - electrospray ionization mass spectrometry in small diameter capillaries, 17:31763 (R;US)

PERFORATION
Numerical simulations of steel plate perforation, 17:31241 (R;US)

PERFORMANCE
Approach to geologic repository post closure system performance assessment, 17:30722 (R;US)

PERMEABILITY COEFFICIENT (FLUID MECHANICS)
See HYDRAULIC CONDUCTIVITY

PEROXIDASES
Applications of micellar enzymology to clean coal technology: Tenth quarterly report, 17:30438 (R;US)

PERSONAL COMPUTERS
ADASAGE40: Ada application development system, 17:32519 (CM;US)

PERSONNEL
  See also MINERS
    PROFESSIONAL PERSONNEL
    REACTOR OPERATORS
  OJT...make 'em or break 'em, 17:32490 (R;US)
  Quality performance-based training enhances safe and effective transport operations, 17:30649 (R;US)
  Using MACCS for on-site worker dose calculations, 17:32002 (R;US)
PERSONNEL DOSIMETRY
  Consistency of external dosimetry in epidemiologic studies of nuclear workers, 17:31987 (RA;US)
PERSONNEL FILM DOSIMETRY
  See PERSONNEL DOSIMETRY
PERSONNEL MONITORING
  Data bank of individual dosimtry control in the JINR, 17:31956 (R;SU;In Russian)
PETN
  Spectroscopic studies of the 110°C thermal aging of PETN, 17:31274 (R;US)
PETROLEUM
  Oil recovery improvement through profile modification by thermal precipitation, 17:30570 (R;US)
  Procurement activities at the Strategic Petroleum Reserve, 17:30584 (R;US)
  Stochastic methods in energy planning: Application to expansion planning and short-term load forecasting, 17:31068 (I;NO)
  Survey of the petroleum trend in Europe, 17:31067 (R;JP;In Japanese)
  Utilizing asphaltene pyrolysis to predict pyrolysis kinetics of heavy crude oil and extractable native bitumen, 17:30603 (R;US)
  [National Institute for Petroleum and Energy Research] monthly progress report for June 1992, 17:30574 (R;US)
PETROLEUM COKE
  See PETROLEUM PRODUCTS
PETROLEUM GEOLOGY
  Reflexion tomography: what information is comprised in the incoming times, 17:30563 (R;FR;In French)
PETROLEUM INDUSTRY
  Petroleum taxation and the incentives for exploration and development, 17:30575 (R;NO)
  Waste minimization in the oil and gas industries, 17:30578 (R;US)
PETROLEUM PRODUCTS
  Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117, 17:30753 (R;US)
  International Petroleum Statistics Report, July 1992 (Contains Glossary.), 17:31073 (R;US)
  Petroleum marketing monthly, August 1992 (Contains Glossary.), 17:30577 (R;US)
  Petroleum supply monthly, August 1992, 17:30576 (R;US)
  Petroleum supply monthly, July 1992, 17:31072 (R;US)
  Short-term energy outlook: Quarterly projections, Third quarter 1992, 17:31066 (R;US)
PETT
  See POSITRON COMPUTED TOMOGRAPHY
PETTEN HIGH FLUX REACTOR
  See HFR REACTOR
PHANTOMS
  [A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1988, 17:31775 (R;US)
PHARMACEUTICALS
  See DRUGS
PHASE SPACE
  Phase space approach to quantum dynamics, 17:32028 (R;FR)
PHONONS
  Comment on the width and the life-time of multiphonon states, 17:32218 (R;FR)
  Electromagnetic decay of two-phonon states, 17:32247 (R;FR)
PHOSPHATE GLASS
  Bonding in simple phosphate glass, 17:31279 (R;US)
PHOSPHORUS 32
  Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32, 17:31993 (RA;US)
PHOTOCHEMICAL OXIDANTS
  A comparison of different chemical models for use in regional simulations of air pollution, 17:31659 (R;SE;In Swedish)
PHOTOCHEMISTRY
  Radiation Laboratory, University of Notre Dame quarterly report, April 1–June 30, 1992, 17:31324 (R;US)
PHOTODETECTORS
  A fast position sensitive photodetector based on a CsI reflective photocathode, 17:31547 (R;FR)
PHOTODISINTEGRATION
  See PHOTONUCLEAR REACTIONS
PHOTOELECTROCHEMICAL CELLS
  Photoelectrochemical production of hydrogen, 17:30796 (RA;SE)
PHOTOIONIZATION
  Physics of correlated systems: Progress report, December 1, 1991–November 30, 1992, 17:32358 (R;US)
PHOTOMAGNETOELECTRIC EFFECT
  See MAGNETIC FIELDS
PHOTON BEAMS
  Photoreactions on the nucleus and on the nucleon with polarized photons, 17:32311 (RA;FR)
  Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons, 17:32259 (R;FR)
  Spin correlations in photo- and electro-disintegration of the few-body systems, 17:32265 (RA;FR)
  Tagged photon beams obtained by laser Compton scattering on electron beams, 17:32266 (RA;FR)
  Thermal imaging of synchrotron beams on silicon crystals, 17:31470 (R;US)
PHOTON TRANSPORT
  Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)
PHOTON-ELECTRON INTERACTIONS
  Single t-quark production in high energy γe collisions, 17:32158 (R;SU)
  Test of QED using a laser at the SLAC final focus test beam, 17:32184 (R;US)
PHOTON-NUCLEON INTERACTIONS
  Electromagnetic excitation of nucleon resonances, 17:32151 (R;US)
PHOTON-PHOTON INTERACTIONS
  Higgs production in a photon-photon collider, 17:32171 (R;FR)
  Inclusive charged hadron and K^0 production in two-photon interactions, 17:32181 (R;US)
  Test of QED using a laser at the SLAC final focus test beam, 17:32184 (R;US)
PHOTONS
  Detection of single photons in the L3 experiment, 17:31586 (R;FR;In French)
PHOTONUCLEAR REACTIONS
  Deuteron photodisintegration by linearly polarized photons in the energy region 0.3-1.0 GeV, 17:32310 (RA;FR)
  Photoreactions on the nucleus and on the nucleon with polarized photons, 17:32311 (RA;FR)
  Treatment of (γ, n) reaction by EGS4 code and connection to MCNP code, 17:32337 (RA;JP;In Japanese)
PHOTOPRODUCTION
  Grenoble contribution to the GRAAL collaboration, 17:32312 (RA;FR)
  Polarization observables in meson photoproduction, 17:32308 (RA;FR)
PHOTOREACTIVATION
  Photoreactivation of γ-induced premutations damages in Drosophila wild and phr^- genotypes, 17:31977 (RA;SU;In Russian)
PHOTORESISTORS
  Latent image exposure monitor using scatterometry, 17:31419 (R;US)

PHOTOSYNTHESIS
The potential effects of concurrent increases in temperature, CO_2 and O_3 on net photosynthesis, as mediated by rubisCO, 17:31687 (R;US)

PHOTOSYNTHETIC BACTERIA
Biological conversion of synthesis gas: Project status report, January 1, 1992–March 31, 1992, 17:30436 (R;US)

PHYSICAL RADIATION EFFECTS
Experimental studies of cascade phenomena in metals, 17:31203 (R;US)

PI-1016 RESONANCES
See MESONS

PICEANCE CREEK BASIN
Multiwell Experiment final report: 4, The fluvial interval of the Mesaverde Formation, 17:30586 (R;US)

PIG ION SOURCES
See PENNING ION SOURCES

PIGE ANALYSIS
See PROTON REACTIONS

PIGMENT CELLS
See ANIMAL CELLS

PINS (FUEL)
See FUEL PINS

PION-PION INTERACTIONS
Analysis of $\pi\pi$ scattering with taking account of the KK-bar abd $\eta\eta$ thresholds, 17:32166 (R;SU;In Russian)
On a method of solution of dispersion equations for low-energy pion-pion scattering, 17:32167 (R;SU;In Russian)

PIONS
See also PIONS NEUTRAL
Chiral corrections to the anomalous 2γ decays of π^0, η and η', 17:32182 (R;US)
Electromagnetic excitation of nucleon resonances, 17:32151 (R;US)
Inverse pion electroproduction at high energies- a source of information on the hadron form factors, 17:32196 (R;SU)
Off-shell effects in the dynamical model of pion photoproduction on nucleon, 17:32326 (R;SU)
Parameters of low-energy physics, radial excitations of π, K, D mesons and QCD potential, 17:32144 (R;SU)
Particle production and survival in muon acceleration, 17:32189 (R;US)
Study of few-body systems using recoil detection, 17:32262 (RA;FR)

PIONS NEUTRAL
Hadrons in statu nascendi, 17:32323 (R;SU)

PIPE RESTRAINTS
See RESTRAINTS

PIPES
Chemical decontamination of Hanford production reactors, 17:30990 (R;US)
Interfacial area and two-phase flow structure development measured by a double-sensor probe, 17:31387 (R;US)
Interim report - Production Test MR-105-12 crossheader purge with chromic acid, 17:30986 (R;US)
Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility), 17:30993 (R;US)

PITCH (REACTOR PARAMETERS)
See REACTOR LATTICE PARAMETERS

PIXE ANALYSIS
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)
Perfecting of a computer program for PIXE quantitative analysis, 17:31293 (R;FR;In French)

PLACENTA
Distribution of ionic indium and gallium in pregnant and non-pregnant animals, 17:31885 (RA;US)

PLANT DISEASES
Proceedings of the 4. Brazilian Meeting on biological control of plant diseases, 17:31864 (I;BR;In Portuguese)

PLANTS
See also FUNGI
TREES
VEGETABLES
Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)
Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)

PLANTS (INDUSTRIAL)
See INDUSTRIAL PLANTS

PLANTS (POWER)
See POWER PLANTS

PLASMA
See also HOMOGENEOUS PLASMA
HOT PLASMA
LASER-PRODUCED PLASMA
Plasma Science Committee (PLSC) and study on new opportunities in plasma science and technology: Technical progress report, July 15, 1991–May 31, 1992, 17:32417 (R;US)
Plasma properties: Progress report for 1991, 17:32415 (R;US)
The time-space structure evolution of tokamak plasma under the mutual interactions of tearing mode with transport process, 17:32398 (R;CN;In Chinese)

PLASMA (BLOOD)
See BLOOD PLASMA

PLASMA (QUARK)
See QUARK MATTER

PLASMA ARC SPRAYING
Solid oxide fuel cell processing using plasma arc spray deposition techniques: Final report, 17:31083 (R;US)

PLASMA CONFINEMENT
See also INERTIAL CONFINEMENT
MAGNETIC CONFINEMENT
International Sherwood fusion theory conference, 17:32402 (R;US)

PLASMA DENSITY
Plasma temperature and density dynamics including particle and heat pinch effects, 17:32408 (R;SE)

PLASMA DIAGNOSTICS
Fusion programs in Applied Plasma Physics: Contract extension report, October 1, 1991–January 31, 1992, 17:32426 (R;US)

PLASMA DISRUPTION
Anharmonicity in resonant perturbations and its effect on stochasticity extension, 17:32425 (R;FR)

PLASMA INSTABILITY
Fast ion-driven Bernstein instabilities, 17:32418 (R;US)

PLASMA SCRAPE-OFF LAYER
DIII-D edge physics database, 17:32475 (R;US)

PLASMA SIMULATION
Application of computer modeling to fusion research: Progress report, November 1, 1991–October 31, 1992, 17:32416 (R;US)

PLASMA SWITCHES
Prediction of electromagnetic pulse generation by picosecond avalanches in high-pressure air, 17:31421 (R;US)

PLASTIC PROPERTIES
See PLASTICITY

PLASTIC SCINTILLATION COUNTERS
See PLASTIC SCINTILLATION DETECTORS

PLASTIC SCINTILLATION DETECTORS
[Effects of ionizing radiation on scintillators and other particle detectors]: Conference summary, 17:31541 (R;US)

PLASTIC SCINTILLATORS
Development of radiation hard scintillators, 17:31603 (R;US)

PLASTICITY
Coal plasticity at high heating rates and temperatures: First technical progress report for the fourth quarter 1989, 17:30439 (R;US)
Thermodynamically consistent theories for elastoplasticity coupled with damage, 17:31242 (R;US)

PLATES
Numerical simulations of steel plate perforation, 17:31241 (R;US)
Optimization of a VISAR for measuring flyer-plate velocities, 17:31634 (R;US)

PLATES (FUEL)
See FUEL PLATES
PLATING SOLUTIONS
See PROCESS SOLUTIONS
PLUMES
Modeling the dispersion of tracer plumes in the Colorado front range boundary layer during night- and day-time conditions, 17:31678 (R;US)
PLUTONIUM
Combustion
200 Areas operation monthly report, October 1967, 17:30636 (R;US)
Counting Techniques
Measurement of total alpha activity of neptunium, plutonium, and americium in highly radioactive Hanford waste by iron hydroxide precipitation and 2-heptanone solvent extraction, 17:30714 (R;US)
Detection
The use of ring ratios to detect sample differences in passive neutron counting, 17:30771 (R;US)
Electronic Structure
Chemistry and Materials Science progress report, first half FY 1992: Weapons-Supporting Research and Laboratory Directed Research and Development, 17:31243 (R;US)
Emission
Plutonium finishing plant comparison with 40 CFR 61, subpart H, and other referenced guidelines for stack 291-Z-1, 17:30757 (R;US)
Fire Extinguishers
200 Areas operation monthly report, October 1967, 17:30636 (R;US)
Gamma Spectroscopy
Recent improvements in plutonium gamma-ray analysis using MGA, 17:30776 (R;US)
Neutron Detectors
Simulation of high level neutron coincidence counter, 17:30765 (R;US)
Nondestructive Analysis
Recent improvements in plutonium gamma-ray analysis using MGA, 17:30776 (R;US)
Processing
200 Areas operation monthly report, October 1967, 17:30636 (R;US)
200 Areas operation monthly report, October 1968, 17:30637 (R;US)
200 Areas operation monthly report, September 1967, 17:30635 (R;US)
Production
200 Areas operation monthly report, October 1967, 17:30636 (R;US)
200 Areas operation monthly report, October 1968, 17:30637 (R;US)
Quantitative Chemical Analysis
Quantitative analysis of plutonium and uranium using reversed-phase liquid chromatography and spectrophotometric detection, 17:31305 (R;US)
Radioassay
Determination of plutonium in environmental water, 17:31292 (R;CN;In Chinese)
Radiochemical Analysis
Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)
Sample Preparation
Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy, 17:30772 (R;US)
Separation Processes
Quantitative analysis of plutonium and uranium using reversed-phase liquid chromatography and spectrophotometric detection, 17:31305 (R;US)
Volatility
Evaluation of actinide volatilities in mixed waste processors, 17:30735 (R;US)
PLUTONIUM 240
Waste crate counter design, 17:30708 (R;US)
PLUTONIUM ISOTOPES
See also PLUTONIUM 240
Intercomparison of plutonium isotopic composition measurements by X-and gamma-ray spectrometry; results from the Pidie exercise, final report, 17:31291 (R;FR;In English, French)
POISONS (CHEMICAL)
See HAZARDOUS MATERIALS
POLAND
Characterization of selected countries, 17:30555 (RA;US)
Radon concentrations in air of Polish underground coal mines, 17:31652 (IA;CA)
POLARIZED BEAMS
A numerical method for the ray-tracing of polarized beams, 17:31451 (R;FR)
Proceedings of the Workshop on future of nuclear physics in Europe with polarized electrons and photons, 17:32259 (R;FR)
POLARIZED TARGETS
Polarized target experiments in Bonn, 17:32309 (RA;FR)
POLISH ORGANIZATIONS
Department of Theoretical Physics. Annual Report 1989, 17:32209 (R;PL)
POLLUTANTS
A computer simulation of ecosystem processes in forests for application to air pollution, acid precipitation and global change, 17:31674 (R;US)
A finite element/finite difference approach for modeling three-dimensional flow and pollutant dispersion around structures, 17:31673 (R;US)
The use of biomarkers to assess environmental health, 17:31692 (R;US)
Work plan for the preliminary assessment and characterization of dense nonaqueous-phase liquids in the Bear Creek Burial Grounds Hazardous Waste Disposal Unit at the Oak Ridge Y-12 Plant, 17:30745 (R;US)
POLLUTION CONTROL EQUIPMENT
See also AIR FILTERS
Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)
Technology descriptions and demonstrations, 17:30419 (RA;US)
POLONIUM 218
Study of the atmospheric chemistry of radon progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992, 17:31912 (R;US)
POLY(VINYLIDENE FLUORIDE)
See FLUORINATED ALIPHATIC HYDROCARBONS
POLYCYCLIC SULFUR HETEROCYCLES
Synthesis of model compounds for coal liquefaction research: Quarterly report No. 1, June 21, 1990–September 20, 1990, 17:30453 (R;US)
Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst, 17:30430 (R;US)
POLYMERIZATION
[New process modeling, design and control strategies for energy efficiency, high product quality and improved productivity in the process industries], 17:31313 (R;US)
POLYMERS
See also INORGANIC POLYMERS
A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)
POLYOLEFINS
Analysis of plasma-treated wire insulation, 17:31622 (R;US)
POLYURETHANES
Process waste assessment (PWA) for monomeric TDI polyurethane foam encapsulation machine mix: Final report, 17:31131 (R;US)
POOL TYPE REACTORS
See also SAPHIR REACTOR
Level 1 probabilistic safety assessment on swimming pool reactor at IAE, 17:30971 (R;CN)
PORE STRUCTURE
See POROSITY

POROSITY
Characterization of porosity via secondary reactions: Quarterly technical progress report, 15 December 1991–15 March 1992, 17:30473 (R;US)
POROUS MATERIALS
A three-dimensional laboratory steam injection model allowing in situ saturation measurements, 17:30569 (R;US)
Numerical dispersion reduction by correction of mass flows. Application to the problem of hydrocarbon recovery by chemical processes, 17:30573 (R;FR;In French)
Visualization of foam/oil in a new, high resolution, sandstone replica micromodel, 17:30568 (R;US)
POSITION SENSITIVE DETECTORS
A fast position sensitive photodetector based on a CsI reflective photocathode, 17:31547 (R;FR)
POSITRON BEAMS
3-dimensional bundle adjustments in industrial metrology: A comparison, 17:31525 (R;US)
POSITRON COMPUTED TOMOGRAPHY
Interest of TOF PET for clinical applications, 17:31771 (R;FR)
SPECT assay of radiolabeled monoclonal antibodies: Third yearly progress report, September 1991–February 1992, 17:31777 (R;US)
POSITRON SOURCES
A simulation study on KEK positron generator, 17:31538 (RA;JP;In Japanese)
Design of the JLC positron source, 17:31502 (RA;JP;In Japanese)
POSITRON-ELECTRON-PROTON STORAGE RING
See PEP STORAGE RINGS
POSITRONIUM
Coherent decay of positronium bose condensate, 17:32362 (R;XA)
Probing atomic-size defects and free volumes with positron and positronium, 17:32370 (R;FR)
POSITRONS
A recovery study of electron irradiated Al-Li alloys, 17:32369 (R;FR)
Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)
Probing atomic-size defects and free volumes with positron and positronium, 17:32370 (R;FR)
Special aspects of positron dosimetry, 17:31899 (RA;US)
POSTULATED PARTICLES
See also DYONS
HIGGS BOSONS
QUARKS
SPARTICLES
TOP PARTICLES
Restrictions on the fluxes of relativistic cosmic photinos according to neutrino experiment KAMIOKANDE, 17:32178 (R;SU;In Russian)
POTABLE WATER
See DRINKING WATER
POTASSIUM CARBONATES
The MAGSORB process for bulk separation of carbon dioxide: Final report, 17:31296 (R;US)
POTASSIUM PHOSPHIDES
High bandwidth second-harmonic generation in partially deuterated KDP, 17:32477 (R;US)
POWDERS
Automated dry powder dispenser for explosive components, 17:31640 (R;US)
Measurement of atomic elastic constants by pulsed neutron powder diffraction, 17:32041 (R;US)
POWER DISTRIBUTION SYSTEMS
Preliminary study of AC power feeders for AGS booster, 17:31479 (R;US)
POWER PLANTS
See also HYDROELECTRIC POWER PLANTS
MHD POWER PLANTS
The design and dimensioning of insulation in power plants and boilers, 17:30863 (R;FI;In Finnish)
POWER REACTORS
See also BWR TYPE REACTORS
CHERNOBYLSK-4 REACTOR
HBWR REACTOR
PWR TYPE REACTORS
PEACH BOTTOM-1 REACTOR
VRAIN REACTOR
WWER-3 REACTOR
World nuclear power plant capacity, 17:31048 (I;DE)
POWER SUPPLIES
Frequency spectrum generated by AGS Booster power swing, heavy ion cycle, 17:31481 (R;US)
The system of standard currents, 17:31493 (R;SU;In Russian)
POWER TRANSMISSION
Spectrum analysis of the power line flicker induced by the electrical test of the prototype Booster dipole, 17:31480 (R;US)
POWER TRANSMISSION LINES
Measurements of electric and magnetic fields in the Waianae, Hawaii area, 17:31041 (R;US)
PRECESSION
On the check-up of the violation of the relativity principle by the investigation of the local properties of spin precession of relativistic electrons conducted at the storage ring, 17:31531 (R;SU;In Russian)
PRECIPITATION
Aqueous solution of iodide under gamma ray irradiation: Fixation of iodide by adding soluble silver salt, 17:31335 (RA;JP)
PREFERRED ORIENTATION
See GRAIN ORIENTATION
PREPARATION (SAMPLE)
See SAMPLE PREPARATION
PRESSURE VESSELS
ASTM international symposium on small specimen test techniques and their applications to pressure vessel annealing and plant life extension, 17:30948 (R;US)
Comprehensive research on sealing behaviour of reactor vessel of 300 MWe nuclear power plant, 17:30880 (R;CN;In Chinese)
Irradiation surveillant test of High Flux Engineering Test Reactor (HFETR) pressure vessel, 17:30972 (R;CN;In Chinese)
LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)
Reactor pressure vessel embrittlement: Report of the IAEA extrabudgetary programme on the safety of WWER-440 model 230 nuclear power plants, 17:30891 (R;XA)
PRESSURIZED WATER COOLED MODERATED REACTOR
See PWR TYPE REACTORS
PRESSURIZED WATER REACTORS
See PWR TYPE REACTORS
PRICES
Survey of international cooperation of the Japanese energy industry for China's air pollution issue. Details 1, 17:31054 (R;JP;In Japanese)
PRIMARY COOLANT CIRCUITS
Corrosion problems of materials for mechanical, power and chemical engineering: National conference, 17:31230 (I;CS;In Czech, Slovak)
PROCEEDINGS
Minutes of Japan-US energy conference/Maui Meeting, 17:31052 (R;JP;In Japanese)
PROCESS CONTROL
On-line process control monitoring system, 17:31306 (PA;US)
PROCESS HEAT REACTORS
The experimental determination of the primary system resistance for 5MW heating test reactor, 17:30970 (R;CN;In Chinese)
PROCESS SOLUTIONS
Improvement of sample preparation for input plutonium accountability measurement by isotope dilution gammy-ray spectroscopy, 17:30772 (R;US)
On-line process control monitoring system, 17:31306 (PA;US)
PROCESSING (DATA)
See DATA PROCESSING
PROCESSING (ORES)
See ORE PROCESSING

PROCESSING (WASTES)
See WASTE PROCESSING
PROCUREMENT
Procurement activities at the Strategic Petroleum Reserve, 17:30584 (R;US)
PRODUCTION (HYDROGEN)
See HYDROGEN PRODUCTION
PRODUCTION (PARTICLE)
See PARTICLE PRODUCTION
PRODUCTION REACTORS
See also SPECIAL PRODUCTION REACTORS
Aluminum oxide film thickness and emittance, 17:31038 (R;US)
Cadmium safety rod thermal tests, 17:30963 (R;US)
Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
Methodology to identify risk-significant components for inservice inspection and testing, 17:31010 (R;US)
Reactor Operations daily reports, July 1, 1970–June 30, 1971, 17:31007 (R;US)
Reactor shield tests, 17:30979 (R;US)
The possibility of steam explosions for a misseated septifoil in the SRS K Production reactor, 17:31035 (R;US)
PROFESSIONAL PERSONNEL
See also SCIENTIFIC PERSONNEL
Progress performance report of clean uses of fossil fuels, 17:32482 (R;US)
PROGENY
New type of radiation aftereffect: study of life span in generations of irradiated drosophila, 17:31976 (RA;SU;In Russian)
PROGRAM MANAGEMENT
See also US DOE PROGRAM MANAGEMENT
PMAS4.0: Performance Measurement Analysis System, 17:32520 (CM;US)
US Department of Energy Uranium Enrichment Activity: Financial statements, September 30, 1991 and 1990, 17:30651 (R;US)
Work for others at the US Department of Energy: Summary report, 17:32487 (R;US)
PROGRAMMING LANGUAGES
See also ADA
Optimization of expressions involving array classes, 17:32563 (R;US)
PROJECT MANAGEMENT
See US DOE PROGRAM MANAGEMENT
PROLACTIN
See LTH
PROMAZINE
See TRANQUILIZERS
PROMETHIUM 147
Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments, 17:31877 (R;CN;In Chinese)
Placental and milk transfer as well as distribution of ^{147}Pm in mouse, 17:31870 (R;CN;In Chinese)
Study on the dose models of ^{147}Pm in tissues of mouse, 17:31869 (R;CN;In Chinese)
PRONGS
See PARTICLE TRACKS
PROPAGATION (WAVE)
See WAVE PROPAGATION
PROPELLANTS
Destruction of explosives and rocket fuels by supercritical water oxidation, 17:31630 (R;US)
PROPERTY MANAGEMENT
DOE Real Property: A yearly statistical handbook: Fiscal year 1992, 17:32486 (R;US)
PROSPECTING
Control of radiation hazards in uranium exploration, 17:30612 (IA;CA)
PROTECTION
See SAFETY
PROTECTION (RADIATION)
See RADIATION PROTECTION
PROTEINS
See also CYTOCHROMES
GROWTH FACTORS
LIPOPROTEINS
MUCOPROTEINS
PEPTIDES
A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG, 17:31838 (RA;US)
Applying ion-molecule reactions to studies of gas-phase protein structure, 17:31762 (R;US)
Capillary electrophoresis - electrospray ionization mass spectrometry in small diameter capillaries, 17:31763 (R;US)
Improved localization of tumor with streptavidin and labeled biotin as a substitute for antibody, 17:31830 (RA;US)
Internal energy effects on the solvation and reactivity of multiply charged biomolecules for electrospray ionization mass spectroscopy, 17:31764 (R;US)
Radioimmunoassay for platelet activation specific protein GMP-140 on the platelet surface and in plasma, 17:31858 (R;CN;In Chinese)
Tandem mass spectrometry of multiply charged proteins with electrospray ionization, 17:31765 (R;US)
PROTEOLIPIDS
See LIPOPROTEINS
PROTON MICROPROBE ANALYSIS
The use of a scanning proton microprobe in AIDS research, 17:31852 (IA;AU)
PROTON REACTIONS
Multiquark stable and metastable states, 17:32329 (RA;SU)
Quasielastic scattering using the (p,n) reaction at 795 MeV, 17:32338 (R;US)
PROTON-INDUCED X-RAY EMISSION ANALYSIS
See PIXE ANALYSIS
PROTON-PROTON INTERACTIONS
A narrow centrally produced 3π resonance at 1080 MeV/c^2 observed in pp-reactions at 19 GeV/c, 17:32179 (R;NO)
Spin observables in the $pp \to pK^+Y$ reactions at Saturne, 17:32154 (R;FR)
Strangeness production in the $pp \to pK^+Y$ and $pA \to pK^+X$ reactions at Saturne, 17:32153 (R;FR)
PROTONS
Evaluation of the high energy proton accumulation effect in the geomagnetic field by the mapping method, 17:32051 (R;SU;In Russian)
Hadrons in statu nascendi, 17:32323 (R;SU)
Penetration of Hydrogen clusters from 10 to 120 kev/u in carbon foils. Study of their slowing-down and charge distribution of emerging fragments, 17:32341 (R;FR;In French)
The proton Compton effect: Recent measurements of the electric and magnetic polarizabilities of the proton, 17:32201 (R;US)
PSI RESONANCES
See MESONS
PSI-3105 RESONANCES
See J PSI-3097 MESONS
PSI-4300 RESONANCES
See MESONS
PUBLIC UTILITIES
See also ELECTRIC UTILITIES
Analysis and evaluation of information network system, 17:32573 (IA;JP;In Japanese)
PULMONARY CANCER
See CARCINOMAS
PULMONARY LAVAGE
See LUNGS
PULPS
See SLURRIES
PULSE COLUMNS
See EXTRACTION COLUMNS
PULSE GENERATORS
Advanced high-explosive flux compression generator development: The CN-III series, 17:31636 (R;US)
Simulation of one-turn system of initial betatron beam oscillations for UNK I stage, 17:31535 (R;SU;In Russian)

PULSE SHAPERS
  Calculation of accelerating voltage shaping circuits by the gradient-ravine method, 17:31517 (R;SU;In Russian)
PULSE STRETCHERS
  See PULSE SHAPERS
PULSED MAGNET COILS
  Calculations of a two-dimensional pulsed magnetic field of an emulsion detector coil by the combined method, 17:31574 (R;SU;In Russian)
PULVERIZATION
  See COMMINUTION
PULVERIZED FUEL ASH
  See FLY ASH
PUMPS
  See also WATER PUMPS
  Recommendations on frequently encountered relief requests, 17:30942 (R;US)
PUREX PROCESS
  200 Areas operation monthly report, October 1967, 17:30636 (R;US)
  200 Areas operation monthly report, September 1967, 17:30635 (R;US)
PWR TYPE REACTORS
  See also QINSHAN REACTOR
    RINGHALS-2 REACTOR
    WWER TYPE REACTORS
    ZION-1 REACTOR
    ZION-2 REACTOR
 Auxiliary Systems
  Aging data analysis and risk assessment: Development and demonstration study, 17:31024 (R;US)
 Burnup
  Economic benefits of increased discharge burnup for PWR: Prospect of increasing discharge burnup for Daya Bay NPP and Qinshan NPP1, 17:30924 (R;CN)
 Containment Systems
  Proceedings of the fifth workshop on containment integrity, 17:31018 (R;US)
 Fission Product Release
  Iodine chemistry in Falcon, 17:30893 (RA;JP)
 Fuel Cycle
  Impact of actinide recycle on nuclear fuel cycle health risks, 17:30642 (R;US)
 In-Service Inspection
  Nondestructive Examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Volume 14, Semiannual report, April 1991–September 1991, 17:31022 (R;US)
  Nondestructive examination (NDE) Reliability for Inservice Inspection of Light Water Reactors: Semiannual report, October 1990–March 1991: Volume 13, 17:30921 (R;US)
 Loss Of Coolant
  Single failure effects on surge line break transients for the VVER-440 reactor, 17:30999 (R;US)
 Outages
  Outage management: A case study, 17:31001 (R;US)
 Pressure Vessels
  Development of a local approach for the intergranular fracture in low alloy steels, 17:31209 (R;FR)
  Effect of a sustained load and a low loading rate on 16 MND5 steel ductile tearing resistance, 17:31207 (R;FR;In French)
  LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)
 Primary Coolant Circuits
  Iodine chemistry in Falcon, 17:30893 (RA;JP)
 Reactor Cooling Systems
  A model for calculation of RCS pressure during reflux boiling under reduced inventory conditions and its assessment against PKL data, 17:31008 (R;US)
 Reactor Instrumentation
  Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences, 17:31025 (R;US)
 Reactor Operation
  Outage management: A case study, 17:31001 (R;US)
 Reactor Vessels
  Development of a local approach for the intergranular fracture in low alloy steels, 17:31209 (R;FR)
  Most likely failure location during severe accident conditions, 17:31009 (R;US)
  Nuclear reactor pressure vessel-specific flaw distribution development, 17:30900 (R;US)
 Risk Assessment
  Workshop on the use of PRA methodology for the analysis of reactor events and operational data: Proceedings, 17:31019 (R;US)
 Sleeves
  History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants, 17:30897 (R;US)
PYRITE
  Cyclic voltammetric study, 17:30422 (RA;US)
  ESCA studies of particulate pyrite, 17:30471 (RA;US)
  Electrochemical and flotation experiments involving particulate mineral and coal pyrite, 17:30424 (RA;US)
  Evaluation of flotation for purification of pyrite for use in thermal batteries, 17:31045 (R;US)
  Performance evaluation of micronized-magnetite cycloning at high relative densities of separation, 17:30427 (R;US)
  The floatability of mineral and coal pyrite, 17:30423 (RA;US)
PYRITES
  See PYRITE
PYROLYSIS
  Cleavage and crosslinking of polymeric coal structures during pyrolysis: Final report, 17:30435 (R;US)
PYROLYSIS PRODUCTS
  See also CHARS
    COAL GAS
  Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991, 17:30437 (R;US)
PYROMETALLURGY
  Mixing and settling in continuous metal production: Progress report, September 15, 1991–May 31, 1992, 17:31221 (R;US)

Q

QINSHAN REACTOR
  A whole reactor model hydraulic test for Qinshan nuclear power plant, 17:30884 (R;CN;In Chinese)
  The dynamic response of the containment of the Qinshan nuclear power plant to the aircraft impact loading, 17:30888 (R;CN;In Chinese)
  The in-pile proving test for fuel assembly of Qinshan nuclear power plant, 17:30881 (R;CN;In Chinese)
QUADRUPOLES
  Commissioning of the Ground Test Accelerator RFQ, 17:31512 (R;US)
  Rf system description for the ground test accelerator radio-frequency quadrupole, 17:31515 (R;US)
QUALITY ASSURANCE
  Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)
QUANTUM CHROMODYNAMICS
  Hadronic and quark screening lengths from lattice QCD, 17:32140 (IA;DE)
  Hadronization of QCD, 17:32143 (R;SU)
  Invariant structures and static forces in gauge theories, 17:32109 (R;SU)
  The chiral and the deconfinement phase transition in the chromodielectric model, 17:32139 (IA;DE)
QUANTUM ELECTRODYNAMICS
  Test of QED using a laser at the SLAC final focus test beam, 17:32184 (R;US)
  The finite temperature QED vacuum, within the mean field approximation, 17:32129 (R;FR;In French)

QUANTUM FIELD THEORY

See also LAGRANGIAN FIELD THEORY
QUANTUM CHROMODYNAMICS
QUANTUM ELECTRODYNAMICS
QUANTUM GRAVITY

A comparison of the real-time and the imaginary-time formalisms of finite temperature field theory for 2,3, and 4-point Green's functions, 17:32121 (R;FR)

Finiteness of the topological models in the Landau gauge, 17:32117 (R;FR)

Quantum fields at finite temperature and density, 17:32070 (R;FR)

Quantum group generalization of the heterotic QFT, 17:32085 (R;XA)

The algebraic versus geometric approach to quantum field theory, 17:32113 (R;FR)

[Mathematics and string theory]: [Annual progress report], 17:32073 (R;US)

QUANTUM GRAVITY

General relativistic model of a spinning cosmic string, 17:32126 (R;NO)

Gravitational effect of the quantum vacuum outside a cosmic string, 17:32127 (R;NO)

QUANTUM MECHANICS

Bell-type experiments and the concept of locally stochastic causality, 17:32046 (R;NO)

Quantum theory and questions of reality and completeness, 17:32045 (R;NO)

Quantum theory and the emergence of patterns in the universe, 17:32042 (R;US)

QUANTUM OPERATORS

See also ANNIHILATION OPERATORS
COMMUTATORS

On Gupta-Bleuler quantization of systems with second-class constraints, 17:32123 (R;NL)

QUARK MATERIAL

See QUARK MATTER

QUARK MATTER

Dilepton radiation from partially equilibrated parton matter, 17:32141 (IA;DE)

Experimental challenges at RHIC and LHC, 17:32278 (R;US)

Heavy-ion collisions and the nuclear equation of state: Progress report, August 15, 1991–March 1992, 17:32281 (R;US)

NA 38 future, 17:32135 (IA;DE)

Quark-gluon plasma searches: today and tomorrow, 17:32131 (R;FR)

Stopping power and viscosity of the quark-gluon plasma, 17:32136 (IA;DE)

The self consistent quark-gluon plasma, 17:32137 (IA;DE)

QUARK MODEL

See also STRING MODELS

Chiral symmetry in particle physics and its manifest realization in terms of parity doublets, 17:32094 (IA;DE)

Nucleon electric form factors and quark sea polarization in the Nambu-Jona-Lasinio model, 17:32138 (IA;DE)

Scale and chiral symmetry breaking at finite density in the NJL model, 17:32093 (IA;DE)

QUARK PLASMA

See QUARK MATTER

QUARK SEA

See QUARK MATTER

QUARK-GLUON PLASMA

See QUARK MATTER

QUARKS

Medium effects on quark and meson masses, 17:32191 (IA;DE)

Single t-quark production in high energy γe collisions, 17:32158 (R;SU)

QUINOLINES

Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)

Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of $Ru_3(CO)_{12}$ (or $RuCl_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)

R

R REACTOR

Project 8980: Savannah River Plant control rod actuators, 17:30958 (R;US)

R-1650 RESONANCES

See MESONS

RADAR

Ultra wide band 3-D cross section (RCS) holography, 17:31625 (R;US)

RADIATION BURDEN

See RADIATION DOSES

RADIATION CHEMISTRY

Radiation Laboratory, University of Notre Dame quarterly report, April 1–June 30, 1992, 17:31324 (R;US)

RADIATION DETECTION AND RANGE

See RADAR

RADIATION DETECTORS

See also CHERENKOV COUNTERS
CRYSTAL COUNTERS
DIELECTRIC TRACK DETECTORS
EMANOMETERS
GAS TRACK DETECTORS
GRAVITATIONAL WAVE DETECTORS
NEUTRON DETECTORS
POSITION SENSITIVE DETECTORS
SCINTILLATION COUNTERS
SHOWER COUNTERS

A use of EGS4 in the TOPAZ detector simulator, 17:31500 (RA;JP;In Japanese)

Design of TOPAZ masking system using EGS4, 17:31501 (RA;JP;In Japanese)

Development of location criteria for criticality alarm detector placements, 17:31362 (R;US)

Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector, 17:31748 (R;US)

Study on the focal-plane detector system for medium heavy ions, 17:31546 (R;CN;In Chinese)

[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1989, 17:31910 (R;US)

[A clinical trial of neutron capture therapy for brain tumors]: Technical progress report 1988, 17:31775 (R;US)

RADIATION DOSE DISTRIBUTIONS

SADDE-MOD1: Scaled absorbed dose distribution evaluator, 17:32542 (CM;US)

Study on the dose models of ^{147}Pm in tissues of mouse, 17:31869 (R;CN;In Chinese)

RADIATION DOSEMETERS

See DOSEMETERS

RADIATION DOSES

Algorithms

Dose calculation algorithm for the Department of Energy Laboratory Accreditation Program, 17:31592 (RA;US)

Calculation Methods

An alternative to convolution integrals for radiation absorbed dose calculations, 17:31905 (RA;US)

Calculations of scaled dose kernels for electrons in tissue, 17:31896 (RA;US)

X-ray and radioiodine dose to thyroid follicular cells, 17:31908 (RA;US)

Computer Calculations

SPECTDOSE: A computerized radiation dosimetry methodology for use with radiolabeled antibodies using quantitative SPECT, 17:31898 (RA;US)

Using MACCS for on-site worker dose calculations, 17:32002 (R;US)

D Codes

DACRIN: Radiation organ dose from inhalation, 17:32536 (CM;US)

I Codes

IRDAM: Interactive rapid dose assessment model, 17:32544 (CM;US)

International Regulations
The biological effects of exposure to RF radiation, 17:31926 (RA;IL;In Hebrew)

Mathematical Models
A new mathematical model of gastrointestinal transit incorporating age- and gender-dependent physiological parameters, 17:31890 (RA;US)
Absorbed dose calculations to blood and blood vessels for internally deposited radionuclides, 17:31891 (RA;US)
An approach to cellular level dosimetry using compartmental model analysis and dynamic PET, 17:31901 (RA;US)
Application of PET and compartmental modeling in estimation of cellular level microdosimetry: PET studies of I-124 labeled 3F8 MAb in human glioma, 17:31902 (RA;US)
Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein, 17:31892 (RA;US)
Development and validation of a simple model for cellular and cell cluster dosimetry with practical application in targeted radionuclide therapy, 17:31907 (RA;US)
Dosimetry of intrathecally administered radiopharmaceuticals, 17:31887 (RA;US)
Dynamic PET scanning and compartmental model analysis to determine cellular level radiotracer distribution in vivo, 17:31900 (RA;US)
Prediction of radiation dose to the GI tract from analysis of blood and liver time-activity curves, 17:31888 (RA;US)
Reevaluation of S-values considering electron transport, 17:31893 (RA;US)

S Codes
SUBDOSA: External dose airborne radionuclides, 17:32535 (CM;US)

V Codes
VARSKIN: Dose calculation of contamination of the skin, 17:32543 (CM;US)

RADIATION DOSIMETRY
See DOSIMETRY

RADIATION EXPOSURE (DOSES)
See RADIATION DOSES

RADIATION HARDENING (CHEMICAL)
See POLYMERIZATION

RADIATION HYGIENE
See RADIATION PROTECTION

RADIATION INDUCED MUTANTS
Kinetics of formation of induced mutants of Saccharomyces cerevisiae, 17:31966 (RA;SU;In Russian)
Study on the early and late mutants of radiation induced rice, 17:31855 (R;CN;In Chinese)

RADIATION MONITORING
See also PERSONNEL MONITORING
Monthly results of measurements. February 1992, 17:31670 (R;FR;In French)
Monthly results of measurements. January 1992, 17:31669 (R;FR;In French)
Monthly results of measurements; December 1991, 17:30968 (R;FR;In French)

RADIATION MONITORS
Calibration of the airborne radon daughter monitor, 17:31554 (IA;CA)
EROS: Electronic radon observation system, 17:31560 (IA;CA)

RADIATION PROTECTION
A shortcoming of NITAWL/BONAMI causing problems in KENO calculations, 17:32516 (R;NL)
Choosing representative body sizes for reference adults and children, 17:31889 (RA;US)
Experience with NQA-1 quality assurance standards applied to in vitro bioassay, 17:31990 (RA;US)
Nuclear safety legislation and supervision in China, 17:30918 (R;CN)
Patients protection during diagnosis and therapy with ionizing radiation: ICRO recommendations, 17:31929 (RA;IL;In Hebrew)
Radiation safety in Israel: Thoughts and expectations, 17:32578 (RA;IL;In Hebrew)
Supervising radiation protection in Israel: A new arrangement, 17:32577 (RA;IL;In Hebrew)
Symposium dedicated to actual problems in radiation safety, 17:31924 (R;IL;In Hebrew)
The radiation protection experience in KSNP of Taiwan during the past decade, 17:31991 (RA;US)

RADIATION PROTECTION LAWS
Canadian and U.S. approaches to occupational health regulations, 17:30780 (IA;CA)

RADIATION SAFETY
See RADIATION PROTECTION

RADIATION SOURCES
See also GAMMA SOURCES
SEALED SOURCES
An elevator for cobalt-60 source, 17:30784 (R;CN;In Chinese)

RADIATION TRANSPORT
See also CHARGED-PARTICLE TRANSPORT
Comparison of TORT and THREEDANT on realistic X-Y-Z shielding problems, 17:32350 (R;US)
Treatment of (γ, n) reaction by EGS4 code and connection to MCNP code, 17:32337 (RA;JP;In Japanese)

RADIO EQUIPMENT
Radio pill antenna range test, 17:31629 (R;US)

RADIO RECEIVERS
See RADIO EQUIPMENT

RADIO TRANSMITTERS
See RADIO EQUIPMENT

RADIOACTIVE BIOLOGICAL WASTES
See RADIOACTIVE WASTES

RADIOACTIVE EFFLUENTS
IRDAM: Interactive rapid dose assessment model, 17:32544 (CM;US)
Miscellaneous Waste Stream strategy document, 17:30703 (R;US)
Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes, 17:30699 (R;FR;In French)

RADIOACTIVE GASEOUS WASTES
See GASEOUS WASTES
RADIOACTIVE WASTES

RADIOACTIVE ION BEAMS
Proceedings of the RCNP cascade project workshop 'heavy ion secondary beam course', 17:31521 (R;JP;In Japanese)

RADIOACTIVE MATERIALS
See also FISSION PRODUCTS
RADIOACTIVE WASTES
A miniature modular multichannel analyzer system for automated, low- resolution gamma-ray spectroscopy, 17:30760 (R;US)
Intra-site secure transport vehicle, 17:30774 (R;US)
Quality performance-based training enhances safe and effective transport operations, 17:30649 (R;US)

RADIOACTIVE WASTE DISPOSAL

Boreholes
Convergence measurements in a 300 m deep borehole in rock salt, 17:30684 (R;NL)
Finite element analyses of a heater-interruption in the HAW test field, 17:30682 (R;NL)

Charges
Report on Fiscal Year 1991 financial statement audit of the Low-Level Radioactive Waste Surcharge Escrow Account (CR-FC-92-1), 17:30664 (R;US)

Concretes
Deformation stresses and mechanical behaviour of engineered barriers in the repository environment, 17:30750 (R;FI;In Finnish)

Containment
Measure of water transfers by diffusion and permeation through materials, 17:30656 (R;FR)

Demonstration Programs
The HADES demonstration and pilot project on radioactive waste disposal in a clay formation, 17:30687 (R;FR)

Environmental Transport
Coupled processes in the near-field, 17:30729 (RA;SE)

Feasibility Studies
Comparative analysis of borehole interaction in the HAW test field, 17:30680 (R;NL)
Geologic Deposits
An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)
Ground Water
Ground water chemistry and water-rock interaction at Olkiluoto, 17:30752 (R;FI)
Ice Caps
On the world's ice ages and changing environments, 17:30747 (R;FI)
SKB/TVO ice age scenario, 17:30748 (R;FI)
Mathematical Models
Testing near-field models for deep disposal, 17:30732 (RA;SE)
Meetings
Proceedings from the technical workshop on near-field performance assessment for high-level waste, 17:30723 (R;SE)
Performance
Scenarios for groundwater flow and radionuclide migration of concern for the TVO-92 safety analysis, 17:30749 (R;FI)
Regulations
1992 Report on Hanford Site land disposal restrictions for mixed wastes, 17:30779 (R;US)
Safety
An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)
Salt Deposits
Jain-Lidiard model calculations of radiation damage in sodium chloride: Presented at the Conference REI'6 (Radiation Effects in Insulators-6), June 24-28, 1991, Weimar, Germany, 17:31271 (R;NL)
Progress report of the 600 m borehole project of the CEC programme on management and storage of radioactive waste: January-June 1991, 17:30679 (R;NL)
Sensitivity Analysis
Sensitivity analysis and validation, 17:30731 (RA;SE)
Site Characterization
Description of hydrogeological data in SKB's database GEOTAB. Version 2, 17:30756 (R;SE)
Thermal Analysis
Comparative analysis of borehole interaction in the HAW test field, 17:30680 (R;NL)
Tunnels
Repository tunnel construction in deep clay formations, 17:30697 (R;FR)
Underground Disposal
Review of available options for low level radioactive waste disposal, 17:30701 (R;XA)
Waste-Rock Interactions
Jain-Lidiard model calculations of radiation damage in sodium chloride: Presented at the Conference REI'6 (Radiation Effects in Insulators-6), June 24-28, 1991, Weimar, Germany, 17:31271 (R;NL)

RADIOACTIVE WASTE FACILITIES
See also ASSE SALT MINE
WIPP
A Remote Characterization System for subsurface mapping of buried waste sites, 17:30715 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3, 17:30676 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5, 17:30677 (R;US)
Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 2, 17:30671 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 3, 17:30672 (R;US)
Grout treatment facility dangerous waste permit application: Revision 2: Volume 4, 17:30673 (R;US)
International Atomic Energy Agency co-operated research programme on the safety assessment of near-surface radioactive waste disposal facilities (NSARS): Results for Test Case 1 (earth trench case), 17:30702 (R;JP)
Review of available options for low level radioactive waste disposal, 17:30701 (R;XA)
Spray nozzle pattern test for the DWPF HEME task technical plan (Defense Waste Processing Facility (DWPF), High-Efficiency Mist Eliminators (HEME)), 17:30744 (R;US)
TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project, 17:30719 (R;US)

RADIOACTIVE WASTE MANAGEMENT
See also RADIOACTIVE WASTE DISPOSAL
RADIOACTIVE WASTE PROCESSING
RADIOACTIVE WASTE STORAGE
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)
Idaho National Engineering Laboratory response to the December 13, 1991, Congressional inquiry on offsite release of hazardous and solid waste containing radioactive materials from Department of Energy facilities, 17:30663 (R;US)

RADIOACTIVE WASTE PROCESSING
200 Areas operation monthly report, October 1968, 17:30637 (R;US)
Independent technical review of Savannah River Site Defense Waste Processing Facility technical issues, 17:30662 (R;US)
Total destruction of organic compounds in aqueous wastes by a UV/H_2O_2 process, 17:30738 (R;US)

RADIOACTIVE WASTE STORAGE
Annotated list of regulations and guidance applicable to temporary storage of commercial Low-Level Radioactive Waste, 17:30667 (R;US)
Design demonstrations for Category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 17:30670 (R;US)
Low-Level Radioactive Waste temporary storage issues, 17:30666 (R;US)
Sample Vial Secure Container (SVSC), 17:30648 (R;US)

RADIOACTIVE WASTES
See also ALPHA-BEARING WASTES
HIGH-LEVEL RADIOACTIVE WASTES
INTERMEDIATE-LEVEL RADIOACTIVE WASTES
LOW-LEVEL RADIOACTIVE WASTES
RADIOACTIVE EFFLUENTS
A system for destroying mixed and hazardous wastes with no gas or liquid effluents, 17:30737 (R;US)
Development of robotics technology for remote characterization and remediationof buried waste, 17:31353 (R;US)
Materials compatibility and corrosion issues for accelerator transmutation of waste, 17:30704 (R;US)
Processing flowsheet for the accelerator transmutation of waste (ATW) program, 17:30707 (R;US)
Remote excavation using the telerobotic small emplacement excavator, 17:31355 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)

RADIOAPPLICATORS
See RADIATION SOURCES

RADIOASSAY
Radioactive waste package assay facility. Volume 1. Application of assay technology, 17:30688 (R;FR)
Radioactive waste package assay facility. Volume 2. Investigation of active neutron and active gamma interrogation, 17:30689 (R;FR)
Radioactive waste package assay facility. Volume 3. Data processing, 17:30690 (R;FR)

- Survey of EEC solid waste arisings and performance of non-destructive assay systems, 17:30695 (R;FR)

RADIOBIOLOGY
- Genetic effects of charged particles: Proceedings of conference, 17:31959 (R;SU)
- [Development and recommendations in the area of ionizing and nonionizing radiations]: Progress report, 1 September 1991–30 April 1992, 17:31911 (R;US)

RADIOCARBON DATING
- *See* CARBON 14

RADIOCHEMISTRY
- Characteristics of potential repository wastes: Volume 1, 17:30869 (R;US)

RADIOCRYSTALLOGRAPHY
- *See* CRYSTALLOGRAPHY

RADIODIAGNOSIS (RADIONUCLIDES)
- *See* NUCLEAR MEDICINE

RADIOFREQUENCY SYSTEMS
- *See* RF SYSTEMS

RADIOGRAPHY (BIOMEDICAL)
- *See* BIOMEDICAL RADIOGRAPHY

RADIOGRAPHY (INDUSTRIAL)
- *See* INDUSTRIAL RADIOGRAPHY

RADIOISOTOPE MIGRATION
- *See* RADIONUCLIDE MIGRATION

RADIOISOTOPE-LABELLED DRUGS
- *See* RADIOPHARMACEUTICALS

RADIOISOTOPES
- *See also* NEUTRON-DEFICIENT ISOTOPES
  NEUTRON-RICH ISOTOPES
- Irradiation techniques employed at the 10 MW_{th} SAPHIR reactor, 17:30995 (R;CH)
- Plutonium finishing plant comparison with 40 CFR 61, subpart H, and other referenced guidelines for stack 291-Z-1, 17:30757 (R;US)
- VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

RADIOLOGICAL PROTECTION
- *See* RADIATION PROTECTION

RADIONUCLIDE MIGRATION
- A compartment model for solute transport in the near field of a repository for radioactive waste (calculations for Pu-239), 17:31732 (R;SE)
- DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)
- DISPERS: Mathematical models for dispersion of radionuclides, 17:32547 (CM;US)
- DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)
- Description of transport pathways in a KBS-3 type repository, 17:31733 (R;SE)
- Near field transport processes, 17:30728 (RA;SE)
- Solubility and speciation studies for nuclear repository performance assessment, 17:30727 (RA;SE)
- Status report on geochemical modelling, 17:30700 (R;DE)
- Summary of the March 25–26, 1991 atmospheric model working meeting: Hanford Environmental Dose Reconstruction Project, 17:31999 (R;US)
- The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)
- The radionuclide migration experiment - overview of investigations 1985 - 1990: Grimsel test site, 17:31729 (R;CH)

RADIONUCLIDE TRANSFER (IN ENVIRONMENT)
- *See* RADIONUCLIDE MIGRATION

RADIONUCLIDES
- *See* RADIOISOTOPES

RADIOPHARMACEUTICALS

Biochemical Reaction Kinetics
- Behavior of various radiochemical species present in Tc-99m labeled monoclonal antibody preparations, 17:31811 (RA;US)
- Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on ligand exchange and binding with hemoglobin: Comparison with In-111 tropolone, 17:31921 (RA;US)
- Evaluation of metyrapone as a radiotracer for SPECT, 17:31846 (RA;US)
- Immunochemical, radiochemical and pharmacokinetic comparison of pepsin-, papain- and bromelain-generated $F(ab')_2$ fragments of the breast carcinoma reactive monoclonal antibody 15A8, 17:31832 (RA;US)
- Interaction of triazolam with central type benzodiazepine receptors studied in living baboons using positron emission tomography, 17:31798 (RA;US)
- Intrinsic efficacies of benzodiazepine receptor ligands evaluated in vivo by positron emission tomography in the primate brain, 17:31799 (RA;US)
- Pharmacokinetics of an anti-CEA antibody radiolabeled with ^{111}In via DTPA and with ^{99m}Tc via two direct labeling methods: A comparison in patients, 17:31831 (RA;US)
- Quantification of ^{76}Br-bromolisuride binding to central dopamine D2 receptors studied in baboon by PET, 17:31797 (RA;US)
- Tc^{99m}-LDL as tracer for LDL-receptor mediated processes, 17:31802 (RA;US)

Biological Localization
- Improved localization of tumor with streptavidin and labeled biotin as a substitute for antibody, 17:31830 (RA;US)
- Mitochondrial and sarcolemmal membrane potentials determine accumulation of the R and S stereoisomers of the technetium isonitrile complex $Tc(CNCH(CH_2CH_3)CH_2OCH_3)_6^+$, 17:31822 (RA;US)
- Purification of radiolabeled monoclonal antibodies to angiotensin-converting enzyme significantly improves specificity and efficacy of its targeting into the lung, 17:31788 (RA;US)
- Quantitation of comparative thrombogenicity of dog, pig and human platelets (PLT) in a hemodialyzer (HD), 17:31840 (RA;US)
- Quantitation of thrombogenicity of technetium-99M and indium-111 labeled canine platelets (PLT) in a hemodialyzer (HD), 17:31839 (RA;US)
- Radioiodinated phospholipid ether analogs as noninvasive tumor imaging agents, 17:31784 (RA;US)
- Technetium labelled somatostatin a potential agent for in vivo tumor localization, 17:31791 (RA;US)

Calibration Standards
- National standards for diagnostic and therapeutic nuclides, 17:31884 (RA;US)

Chemical Preparation
- ^{188}Re-EDTMP,, ^{188}Re-MDP, ^{188}Re-DMSA - The radiochemistry and radiopharmacology of the new potentially useful therapeutical agents, 17:31792 (RA;US)
- A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG, 17:31838 (RA;US)
- A novel bifunctional chelating agent α,ε-N,N′-bis(L-cysteinyl)-L-lysine for radiolabeling of monoclonal antibodies with technetium-99m, 17:31827 (RA;US)
- A simple method for producing a technetium-99m-labeled liposome which is stable in vivo, 17:31815 (RA;US)
- Biological evaluation of selected carbohydrate antibody conjugates, 17:31833 (RA;US)
- Comparison of methods for incorporating a radioiodinated residualizing cholesteryl ester analog into low density lipoprotein, 17:31812 (RA;US)
- Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)
- I-131 anti-Ama monoclonal antibody for radioimaging of atheromas, 17:31836 (RA;US)
- In-111-acetylacetone-cyclodextrin inclusion complex: A new form of radiopharmaceutical, 17:31793 (RA;US)
- Mapping histone4 mRNA in pig brain with In-111 labeled antisense oligo-nucleotide by in-situ hybridization, 17:31801 (RA;US)
- Non-invasive imaging of histone4 mRNA transcription in mammary tumor with In-111 labeled aminohexyl oligonucleotide in a mouse model, 17:31821 (RA;US)

Pertechnetate solutions: Their history and the labelling of HM-PAO, 17:31790 (RA;US)
Preparation and biodistribution of Tc^{III}-N,N′-ethylenebis (acetylacetone thioiminato) bis (triphenylphosphine) complex, 17:31825 (RA;US)
Preparation of bromine-77 labeled monoclonal anti-hPLAP antibody using chloramine-T, 17:31835 (RA;US)
Production of no-carrier added Yttrium-86 for radio-immunoimaging using positron emission tomography (PET), 17:31844 (RA;US)
Radioarsenic labeled compounds: Synthesis and biological evaluation for potential application in nuclear imaging and therapy, 17:31772 (RA;US)
Radiopharmacology of new diiodo analogs of calichemicin fragment, 17:31800 (RA;US)
Synthesis and evaluation of radioiodinated cholesteryl ethers as lipoprotein probes, 17:31813 (RA;US)
Synthesis of tracers using automated radiochemistry and robotics: Progress report, April 1, 1992–July 31, 1992, 17:31331 (R;US)
Synthesis, pharmacokinetic and clinical studies of ^{131}I-MIBG prepared in Mexico, 17:31837 (RA;US)
Technetium-99m biguanide complexes: ^{99m}Tc-1,1-dimethylbiguanide, 17:31826 (RA;US)
The preparation and biodistribution of secondary Tc-HMPAO, 17:31779 (RA;US)

Chemical Properties
Pharmacological properties of lisuride radiolabeled derivatives used for in vivo imaging of D2 dopamine receptors, 17:31796 (RA;US)

Dosimetry
A new approach to radiopharmaceutical dose assessment, 17:31882 (RA;US)
An approach to cellular level dosimetry using compartmental model analysis and dynamic PET, 17:31901 (RA;US)
Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein, 17:31892 (RA;US)
Biokinetics and dosimetry of Tc-99m HM-PAO in children, 17:31904 (RA;US)
Development and validation of a simple model for cellular and cell cluster dosimetry with practical application in targeted radionuclide therapy, 17:31907 (RA;US)
Dosimetry of ^{99m}Tc-P53, a new myocardial perfusion imaging agent, 17:31773 (RA;US)
Dosimetry of intrathecally administered radiopharmaceuticals, 17:31887 (RA;US)
Effective dose to the patient from radiopharmaceuticals calculated with the new ICRP tissue weighting factors, 17:31880 (RA;US)
External beam and radioimmunotherapy dosimetry comparison of colorectal xenografts, 17:31883 (RA;US)
In vivo distribution and dosimetry of Tc-99m MIBI in man, 17:31906 (RA;US)
Radiation dosimetry for Tc-99m MAG3 in adults and children, 17:31903 (RA;US)
SPECTDOSE: A computerized radiation dosimetry methodology for use with radiolabeled antibodies using quantitative SPECT, 17:31898 (RA;US)
Special aspects of positron dosimetry, 17:31899 (RA;US)
The interpretation of animal data in the calculation of doses from new radiolabeled compounds, 17:31881 (RA;US)

Evaluation
Enhanced tumor imaging with PokeWeed Mitogen, 17:31820 (RA;US)
Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts, 17:31804 (RA;US)
Evaluation of multiple-dose ^{153}Sm-EDTMP for bone pain palliation in cancer patients, 17:31787 (RA;US)
Labeling, control and radiopharmaceutical evaluation of ^{99m}Tc-ADP as tumor seeking agent, 17:31818 (RA;US)
Synthesis and evaluation of technetium-99m monocationic mixed ligand complexes of phenyl substituted/condensed tetradentate Schiff's bases and trimethylphosphine, 17:31780 (RA;US)

Metabolism
Analysis of [F-18]-L-6-fluorodopa and metabolites in plasma for PET studies, 17:31845 (RA;US)
Clearance curve analysis of extravascularly distributed radiopharmaceuticals, 17:31809 (RA;US)
Effect of DTPA molecules conjugated to lysine residues on metabolism of I-125 and Tc-99m labeled T101, 17:31806 (RA;US)
Effect of stereoisomers (d,l and meso) of Tc-99m HMPAO on platelet kinetics in Beagle dogs: Comparison with In-111 labeled platelets, 17:31913 (RA;US)
Intratumoral injection of 5-^{125}I-iodo-2′-deoxyuridine in patients with colon cancer, 17:31817 (RA;US)
Preliminary studies on the metabolism of Tc-99m MAb-170, 17:31805 (RA;US)

Microdosimetry
A Monte Carlo simulation of boron neutron capture reactions in cells - Microdosimetric aspects, 17:31774 (RA;US)
Application of PET and compartmental modeling in estimation of cellular level microdosimetry: PET studies of I-124 labeled 3F8 MAb in human glioma, 17:31902 (RA;US)

Research Programs
Tumortropic metal-complexes at the crossroads between diagnosis and therapy - A radiopharmacologic reflection, 17:31783 (RA;US)

Retention
Comparative PMN granulocyte retention of In-111 and Tc-99m HMPAO labeled PMN granulocyte of dogs on cellulose acetate hemodialyzers (HD), 17:31841 (RA;US)
Comparative loss of In-111 labeled PMN granulocyte from dog, pig and man to cellulose acetate hemodialyzer (HD), 17:31842 (RA;US)

Specificity
Tumor-specific Y-90 species in solution for animal and human tumor therapy, 17:31786 (RA;US)

Stability
Coupling of ^{125}I-EGF to serum albumin to stabilize the radioiodine bond: Radiolabeling, purification by HPLC, stability and biodistribution in mice, 17:31829 (RA;US)
The stability in liver homogenate of In and Y anti-CEA antibody radiolabeled via DTPA and SCN-Bz-DTPA, 17:31807 (RA;US)

Structure-Activity Relationships
Indium-111 labelled cationic complexes of aminothiols. Structure-activity correlation, 17:31794 (RA;US)

Tissue Distribution
^{153}Sm-EDTMP and ^{99m}Tc-EDTMP - The radiopharmacology of two potential bone metastasis radiopharmaceuticals, 17:31914 (RA;US)
A model for electron and beta energy deposition within trabecular bone, 17:31895 (RA;US)
A new approach to localize sites of inflammation using streptavidin and biotin – an improvement over nonspecific polyclonal IgG, 17:31838 (RA;US)
A novel bifunctional chelating agent α,ε-N,N′-bis(L-cysteinyl)-L-lysine for radiolabeling of monoclonal antibodies with technetium-99m, 17:31827 (RA;US)
An animal model for radiopharmaceutical research (Didelphis albiventis) in HM-PAO-Tc-99m use, 17:31843 (RA;US)
Biodistribution parameters and radiation absorbed dose estimates for radiolabeled human low density lipoprotein, 17:31892 (RA;US)
Biological evaluation of selected carbohydrate antibody conjugates, 17:31833 (RA;US)
Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)
Correlation of lipophilicity to biodistribution of Tc-99m labelled aminothiols, 17:31782 (RA;US)
Coupling of ^{125}I-EGF to serum albumin to stabilize the radioiodine bond: Radiolabeling, purification by HPLC, stability and biodistribution in mice, 17:31829 (RA;US)
Dynamic PET scanning and compartmental model analysis to determine cellular level radiotracer distribution in vivo, 17:31900 (RA;US)

Elevated brain uptake of ^{59} citrate: Correlation with the critical period of brain development in experimental phenylketonuria, 17:31920 (RA;US)
Enhancement of liver uptake of a radioiodinated triglyceride analog by prior incorporation into a lipoprotein-like emulsion, 17:31917 (RA;US)
From pure radionuclide species in solution through pure radiopharmaceuticals and simple radiopharmacology to disease-specific nuclear medicine, 17:31810 (RA;US)
Hepatic uptake of a radiolabeled monoclonal antibody is not receptor-mediated, 17:31803 (RA;US)
Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc, 17:31834 (RA;US)
Preparation and biodistribution of Tc^{III}-N,N′-ethylenebis (acetylacetone thioiminato) bis (triphenylphosphine) complex, 17:31825 (RA;US)
Radiopharmacological studies of ^{99m}Tc-CPI: Experience with isolated rat atrial tissue, 17:31823 (RA;US)
Radiopharmacological studies of a new functionalized isonitrile technetium complex: $[Tc(2\text{-ethoxy-}2\text{-methylpropylisonitrile})_6]^+$, 17:31824 (RA;US)
Radiopharmacology of inhaled Xe-133 in skeletal sites containing deposits of Gaucher cells, 17:31795 (RA;US)
Strategies for pharmacokinetic modeling of monoclonal antibody biodistribution in man, 17:31808 (RA;US)
Synthesis, pharmacokinetic and clinical studies of ^{131}I-MIBG prepared in Mexico, 17:31837 (RA;US)
Tc^{99m}-LDL kinetics in the isolated perfused rat liver, 17:31814 (RA;US)
Tc-99m-labeled adriamycin, 17:31781 (RA;US)
The preparation and biodistribution of secondary Tc-HMPAO, 17:31779 (RA;US)
Tissue distribution and biokinetics of radiolabeled proteins in rats with a focal infection, 17:31918 (RA;US)
Tissue localization of ^{125}I-Triiodothyronine in the periorbital area of mice: A microautoradiographic study, 17:31916 (RA;US)

Uptake
^{11}C-thymidine: An in-vivo tracer for cell proliferation, 17:31819 (RA;US)
$Ga(NO_3)_3$ uptake by human-derived small cell lung cancer cells, 17:31789 (RA;US)
Uptake of radiolabeled 1-(2-deoxy-2-fluoroarabinofuranosyl)-5-halouracils by experimental tumors in vivo, 17:31785 (RA;US)

RADIOPOLYMERIZATION
See POLYMERIZATION

RADIORESISTANCE
See RADIOSENSITIVITY

RADIOSENSITIVITY
Cytogenetics of radiation-induced adaptation in man lymphocytes, 17:31973 (RA;SU;In Russian)
X-radiation and hydrogen peroxide induce adaptation of lymphocytes of man peripheral blood to subsequent x-irradiation, 17:31972 (RA;SU;In Russian)

RADIOSENSITIZERS
Structure-activity relationships among nitroimidazole nucleosides used as markers of tissue hypoxia, 17:31915 (RA;US)
[^{35}S] cysteamine and 2-aminoethylisothio uronium bromide hydrobromide: Improved syntheses, biodistributions and implications of protection from radionuclides, 17:31919 (RA;US)

RADIOWAVE RADIATION
See also LONG WAVE RADIATION
SHORT WAVE RADIATION
The biological effects of exposure to RF radiation, 17:31926 (RA;IL;In Hebrew)

RADIUM A
See POLONIUM 218

RADIUM D
See LEAD 210

RADON
A passive integrating radon dosimeter combining activated charcoal and TLD, 17:31563 (IA;CA)
Computer modeling of radon transport into underground openings, 17:31723 (IA;CA)
Estimation of population expected exposure as a result of mining in Sde Zohar field, 17:31665 (R;IL;In Hebrew)
Improved thomas formula for radon measurement, 17:31644 (R;CN;In Chinese)
Local static method for measuring radon emanation rate from porous materials, 17:31718 (IA;CA)
Measurement system of 'free' radon in rocks, 17:31700 (IA;IL)
Radon - its concentrations and hazards in the world and in Israel, 17:31928 (RA;IL;In Hebrew)
Radon and radon daughter concentrations over an extended uranium ore body, 17:30614 (IA;CA)
Radon concentrations in air of Polish underground coal mines, 17:31652 (IA;CA)
Radon in rock units in the Negev, Israel, 17:31710 (IA;IL)
Radon transport into underground openings, 17:31721 (IA;CA)
Randomization of grab sampling strategies for estimating the exposure of uranium miners to radon daughters, 17:30615 (IA;CA)
Rn gas level as an indicator to the radiological impact of Rn progeny, 17:31650 (IA;IL)
Study of the atmospheric chemistry of radon progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992, 17:31912 (R;US)

RADON 220
Removal or airborne thoron (radon) daughters on mine walls and other surfaces by convective deposition and electrostatic plate-out, 17:30622 (IA;CA)
Thoron daughter to radon daughter ratios in mines, 17:31657 (IA;CA)

RADON 222
Activated carbon filter paper method for the measurement of radon and thoron concentration, 17:31564 (IA;CA)
Comparative tests of radon and radon daughter detection systems under simulated environmental conditions, 17:31552 (IA;CA)
Electrical properties of radon daughters, 17:31656 (IA;CA)
Experimental verification of the theory of clusters, 17:31947 (IA;CA)
Mine tests of a passive electret dosimeter for radon/thoron daughters, 17:31561 (IA;CA)
Radioecological aspects of former mining activities in the Saxon Erzgebirge, 17:31716 (IA;AT)
Radon and radon daughter products: Their chemistry after alpha-decay, 17:31334 (IA;CA)
The dynamic theory of clusters, 17:31944 (IA;CA)
Thermophoretic collection of radon daughters with potential application to personal dosimetry, 17:31948 (IA;CA)

RADON MONITORS
See EMANOMETERS

RAHYD PROCESS
See REPROCESSING

RAIN WATER
^{36}Cl in rainwater in Israel, 17:31704 (IA;IL)
The isotopic composition of strontium in Israeli rains, 17:31705 (IA;IL)

RANDOM NUMBER GENERATORS
Random one-of-N selector, 17:30773 (PA;US)

RANDOMNESS
Random matrix theories and chaotic dynamics, 17:32024 (R;FR)

RARE EARTH NUCLEI
See also DYSPROSIUM 156
DYSPROSIUM 158
DYSPROSIUM 160
DYSPROSIUM 162
DYSPROSIUM 164
EUROPIUM 152
PROMETHIUM 147
THULIUM 170
Study of short-lived rare earth nuclei near the proton drip line, 17:32213 (R;US)

RBE
Comparative aspects of carcinogenic effects caused by protons, helium ions and γ-radiation, 17:31981 (RA;SU;In Russian)

REACTOR ACCIDENTS
See also FUEL ELEMENT FAILURE
LOSS OF FLOW
Environmental and agricultural impacts of the Chernobyl NPP accident on the countries of the northern hemisphere, 17:31867 (R;CN;In Chinese)
Organizational culture during the accident response process, 17:31000 (R;US)
Radioactive waste management in the USSR: A review of unclassified sources: Volume 2, 17:30711 (R;US)
Resources available for nuclear power plant emergencies under the Price-Anderson Act and the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 17:31017 (R;US)
SUBDOSA: External dose airborne radionuclides, 17:32535 (CM;US)
The Canadian programme on iodine chemistry in reactor safety, 17:31014 (RA;JP)

REACTOR COMPONENTS
See also BREEDING BLANKETS
CONTROL ELEMENTS
CONTROL ROD DRIVES
FUEL ELEMENTS
REACTOR COOLING SYSTEMS
REACTOR CORES
A survey of fatigue monitoring in the nuclear power industry, 17:30941 (R;US)
Aging data analysis and risk assessment: Development and demonstration study, 17:31024 (R;US)
Aluminum oxide film thickness and emittance, 17:31038 (R;US)
Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
Experiments to investigate the effects of 1:10 scale Zion structures on direct containment heating (DCH) in the Surtsey Test Facility: The IET-1 and IET-1R tests, 17:30899 (R;US)

REACTOR CONTROL RODS
See CONTROL ELEMENTS

REACTOR CONTROL SYSTEMS
Failure detection studies by layered neural network, 17:30959 (R;NL)

REACTOR COOLING SYSTEMS
See also PRIMARY COOLANT CIRCUITS
SECONDARY COOLANT CIRCUITS
A model for calculation of RCS pressure during reflux boiling under reduced inventory conditions and its assessment against PKL data, 17:31008 (R;US)
An assessment of ^{238}Pu and $^{239+240}$Pu in the primary cooling water of a PWR, 17:30898 (R;DK)
Analyses of the reflector tank, cold source, and beam tube cooling for ANS reactor, 17:30994 (R;US)
Effluent versus inlet header break analysis for SRS-reactor LOPA scenario, 17:30950 (R;US)
Intergranular stress corrosion cracking: A rationalization of apparent differences among stress corrosion cracking tendencies for sensitized regions in the process water piping and in the tanks of SRS reactors, 17:30996 (R;US)

REACTOR CORES
Development and research of in-core transducers at IAE (Institute of Atomic Energy), 17:31606 (R;CN;In Chinese)
Impact of increasing MHTGR power on passive heat removal, 17:30903 (R;US)
Non-isotropic thermal behavior of an MHTGR fuel block: Impact upon reactivity feedback, 17:30901 (R;US)

REACTOR FUEL ELEMENTS
See FUEL ELEMENTS

REACTOR FUELS
See NUCLEAR FUELS

REACTOR INSTRUMENTATION
Aging assessment of reactor instrumentation and protection system components: Aging-related operating experiences, 17:31025 (R;US)
DOE Fundamentals Handbook: Instrumentation and Control, Volume 1, 17:30934 (R;US)
DOE Fundamentals Handbook: Instrumentation and Control, Volume 2, 17:30935 (R;US)

REACTOR LATTICE PARAMETERS
Calchulation of physical parameters of the subcritical assembly located in the higher Institute of Nuclear Sciences and Technology, 17:30939 (I;CU;In Spanish)

REACTOR LATTICE PITCH
See REACTOR LATTICE PARAMETERS

REACTOR LICENSING
Nuclear Regulatory Commission issuances, June 1992: Volume 35, No. 6, 17:30920 (R;US)

REACTOR MONITORING SYSTEMS
Radiation monitor system for nuclear power plants, 17:30955 (R;CN;In Chinese)

REACTOR OPERATORS
DOE Fundamentals Handbook: Classical Physics, 17:30926 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 1, 17:30927 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 2, 17:30928 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 3, 17:30929 (R;US)
DOE Fundamentals Handbook: Electrical Science, Volume 4, 17:30930 (R;US)
DOE Fundamentals Handbook: Instrumentation and Control, Volume 1, 17:30934 (R;US)
DOE Fundamentals Handbook: Instrumentation and Control, Volume 2, 17:30935 (R;US)
DOE Fundamentals Handbook: Mathematics, Volume 1, 17:30936 (R;US)
DOE Fundamentals Handbook: Mathematics, Volume 2, 17:30937 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 3, 17:30933 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 1, 17:30931 (R;US)
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 2, 17:30932 (R;US)

REACTOR PHYSICS
Nuclear Safety Research Department. Annual progress report 1991, 17:32500 (R;DK)
Status of the JEF and EFF projects: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:30940 (R;NL)

REACTOR SAFETY
Nuclear safety legislation and supervision in China, 17:30918 (R;CN)
Report on the activities of the Czechoslovak Atomic Energy Commission in performing its function of State Surveillance over Nuclear Safety of Nuclear Facilities in 1991, 17:30892 (I;CS;In Czech)
The standard molar enthalpies of formation of $BaSiO_3$(s) and Ba_2SiO_4(s), 17:30960 (R;NL)

REACTOR SITES
AISITE2: Parametric site requirement study, 17:32530 (CM;US)

REACTOR SITING
See SITE SELECTION

REACTOR VESSELS
Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)
Most likely failure location during severe accident conditions, 17:31009 (R;US)
Nuclear reactor pressure vessel-specific flaw distribution development, 17:30900 (R;US)

REACTORS
See also POWER REACTORS
PROCESS HEAT REACTORS
PRODUCTION REACTORS
WATER COOLED REACTORS
Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)

REAGENTS
Oil recovery improvement through profile modification by thermal precipitation, 17:30570 (R;US)
RECIPROCAL TRANSLOCATIONS
See CHROMOSOMAL ABERRATIONS
RECOILS
Nucleon recoil polarization in quasi-elastic electron scattering with two-body currents, 17:32264 (RA;FR)
Study of few-body systems using recoil detection, 17:32262 (RA;FR)
RECOVERY (TRITIUM)
See TRITIUM RECOVERY
RECTUM
Evaluation of ^{99m}Tc labelled anti CEA monoclonal antibody in immunsupressed mice bearing human colorectal carcinoma xenografts, 17:31804 (RA;US)
External beam and radioimmunotherapy dosimetry comparison of colorectal xenografts, 17:31883 (RA;US)
Labeling and radioimmunoscintigraphic application of monoclonal antibodies with 131-I and 99m-Tc, 17:31834 (RA;US)
RECYCLE (FUEL)
See FUEL CYCLE
RECYCLING (FUEL)
See REPROCESSING
REFORMER PROCESSES
Development of catalysts for internal reforming in molten carbonate fuel cell, 17:31087 (R;SE)
REFRACTORIES
Combustion synthesis method and products, 17:31261 (PA;US)
REFRIGERANTS
CFC environmental problems and cooling technology, 17:31647 (R;DK;In Danish)
Evaporation of nonazeotropic mixture of refrigerants R143a and R124 flowing inside smooth and corrugated tubes, 17:31386 (R;US)
REFRIGERATING MACHINERY
Cryogenic refrigeration for Maglev requirements and opportunities, 17:31172 (RA;US)
He II and Maglev - Is there a role? (Magnetic levitation), 17:31173 (RA;US)
REFRIGERATION
New technologies for refrigeration without CFCs, 17:31133 (R;US)
REFRIGERATORS
Adaptive control of a refrigeration system: Feasibility analysis and controller design, 17:31098 (R;DK)
Trend in energy demand in factory air conditioning.: Analysis by a questionnaire of actual situation of air conditioning for cooling, 17:31130 (R;JP;In Japanese)
REFUSE
See SOLID WASTES
REFUSE-FUELED BOILERS
Physical modelling of a refuse fueled boiler, 17:30808 (R;SE;In Swedish)
Study of a MSW incinerator: Overall operation and on-site measurements in the fire box, 17:30809 (R;SE)
REGULATIONS
1992 Report on Hanford Site land disposal restrictions for mixed wastes, 17:30779 (R;US)
Approach to geologic repository post closure system performance assessment, 17:30722 (R;US)
Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
REINFORCED MATERIALS
Ductile fracture process of discontinuous fiber reinforced composites, 17:31272 (R;US)
RELATIVE BIOLOGICAL EFFECTIVENESS
See RBE
RELATIVITY THEORY
Relativity theory in (2+2)-space, 17:32030 (R;SU)
RELEASE (FISSION PRODUCT)
See FISSION PRODUCT RELEASE
REMEDIAL ACTION
Applied research and development private sector accomplishments: FY90 contracts, 17:31061 (R;US)
Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)
Line Program Environmental Management Audit: Formerly Utilized Sites Remedial Action Program, 17:32488 (R;US)
REMOTE HANDLING EQUIPMENT
Automated dry powder dispenser for explosive components, 17:31640 (R;US)
Automated weapon disassembly, 17:31364 (R;US)
RENEWABLE RESOURCES
Electricity from biomass: A development strategy, 17:30801 (R;US)
REPAIR (BIOLOGICAL)
See BIOLOGICAL REPAIR
REPROCESSING
See also PUREX PROCESS
ZIRFLEX PROCESS
Conceptual design of fixed bed burning system: A study of the head-end process for Th-U nuclear fuel cycle in HTGR, 17:30639 (R;CN;In Chinese)
REPUBLIC OF CHINA
See TAIWAN
REPUBLIC OF KOREA
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
RESEARCH PROGRAMS
LVIS-2000 and ETRR Future building services and energy-efficient buildings and building components: Evaluation of the research programmes 1988-1990, 17:31107 (R;FI)
RESEARCH REACTORS
See also ACPR REACTOR
FFTF REACTOR
HFR REACTOR
NSRR REACTOR
Analyses of the reflector tank, cold source, and beam tube cooling for ANS reactor, 17:30994 (R;US)
Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)
Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B, Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, S, 17:30902 (R;US)
RESERVES
See also STRATEGIC PETROLEUM RESERVE
US NAVAL PETROLEUM RESERVES
Basic mapping for evaluation of prospective geothermal potential regions in the 1:500,000 topographic map 'Niigata', 17:30836 (IA;JP;In Japanese)
RESERVOIR ROCK
A pore-level scenario for the development of mixed-wettability in oil reservoirs, 17:30571 (R;US)
Analysis of reservoir heterogeneities due to shallowing-upward cycles in carbonate rocks of the Pennsylvanian Wahoo Limestone of Northeastern Alaska: Annual report, October 1990–September 1991, 17:30560 (R;US)
Characterization of reservoir rocks and fluids by surface electromagnetic transient methods: Annual report, January 1991–January 1992, 17:30561 (R;US)
Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report, 17:30567 (R;US)
Hypothesis on competition of thermal conduction zone and juvenile hydrothermal solution retention zones in the surroundings of magma, 17:30840 (IA;JP;In Japanese)
Multiwell Experiment final report: 4, The fluvial interval of the Mesaverde Formation, 17:30586 (R;US)
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)
[In-situ permeability determination and fracture characterization using elastic waves]: Progress report, 17:30562 (R;US)

RESIDENCES
See HOUSES
RESIDENTIAL BUILDINGS
See also HOUSES
Analysis of heat accumulation capacities in relation to residential buildings, 17:31106 (R;DK;In Danish)
Analysis of heat accumulation capacities in relation to residential buildings: Literature study (Especially in relation to furnishings etc.), 17:31101 (R;DK;In Danish)
Residential electricity consumption, 17:31118 (R;FI;In Finnish)
RESIDUES (RADIOACTIVE)
See RADIOACTIVE WASTES
RESISTAL
See COPPER BASE ALLOYS
RESISTANCE HEATING
'Soft' electric heating. Control of resistance heating radiators, 17:31108 (R;SE;In Swedish)
RESISTIVITY SURVEYS
Analysis and evaluation of resistivity data.: MT profiling of the southerm Tohoku district, 17:32010 (IA;JP;In Japanese)
RESONANCE CAVITIES
See CAVITY RESONATORS
RESOURCE ASSESSMENT
Study on collection of resource evaluation bases in the northern Tohoku district (Akita-Koma).: Geological survey of Tashirodake and Tara-Komagadake areas, 17:30835 (IA;JP;In Japanese)
RESOURCE DEVELOPMENT
Unconventional gas systems analysis, 17:30590 (R;US)
RESOURCE MANAGEMENT
Statistical process management: An essential element of quality improvement, 17:32501 (R;US)
RESPIRABLE DUSTS
See DUSTS
RESPIRATORY SYSTEM
See also LUNGS
DACRIN: Radiation organ dose from inhalation, 17:32536 (CM;US)
Study of the atmospheric chemistry of radon progeny in laboratory and real indoor atmospheres: Progress report, July 1, 1991–June 30, 1992, 17:31912 (R;US)
RESPONSE FUNCTIONS
Response functions for infinite fermion systems with velocity dependent interactions, 17:32230 (R;FR)
RESTRAINTS
Machining technology for spider of control assembly, 17:30954 (R;CN;In Chinese)
RETORTING
HRS pilot plant and modeling results, 17:30601 (R;US)
REVERSE-FIELD PINCH
Anomalous ion heating and superthermal electrons in the MST reversed-field pinch, 17:32413 (R;US)
Current density fluctuations, nonlinear coupling, and transport in MST, 17:32412 (R;US)
Measurement of current density fluctuations and ambipolar particle flux due to magnetic fluctuations in MST, 17:32411 (R;US)
REVERSED-FIELD MIRRORS
Annual performance report for "A program of FRC theory research", 17:32448 (R;US)
RF SYSTEMS
Analytical formulas for the resonant frequency changes due to opening apertures on cavity walls, 17:31505 (R;FR)
Longitudinal beam dynamics with rf noise, 17:31468 (R;US)
Numerical design of an rf-coupling Iris, 17:31504 (R;FR)
Self-generated stochastic heating in an rf discharge: Annual progress report, May 15, 1991–May 14, 1992, 17:32410 (R;US)
RHO-1500 RESONANCES
See MESONS
RHO-1700 RESONANCES
See MESONS
RIBULOSE DIPHOSPHATE CARBOXYLASE
The potential effects of concurrent increases in temperature, CO_2 and O_3 on net photosynthesis, as mediated by rubisCO, 17:31687 (R;US)
RICE
Study on the early and late mutants of radiation induced rice, 17:31855 (R;CN;In Chinese)
RICHLAND FFTF REACTOR
See FFTF REACTOR
RIEMANN WAVES
See SHOCK WAVES
RINGHALS-2 REACTOR
An assessment of ^{238}Pu and $^{239+240}$Pu in the primary cooling water of a PWR, 17:30898 (R;DK)
RINGS (STORAGE)
See STORAGE RINGS
RISER CRACKING
See COAL LIQUEFACTION
RISK ANALYSIS
See RISK ASSESSMENT
RISK ASSESSMENT
Balancing risk: Ethical issues in risk assessment, 17:31057 (R;US)
Issues in risk assessment and modifications of the NRC health effects models, 17:31998 (R;US)
Risk assessment handbook, 17:30759 (R;US)
Risk assessment technique for evaluating research laboratories, 17:32007 (R;US)
RISOE NATIONAL LABORATORY
Materials Department. Annual report 1991, 17:32498 (R;DK)
Nuclear Safety Research Department. Annual progress report 1991, 17:32500 (R;DK)
Optics and Fluid Dynamics Department. Annual progress report 1 January - 31 December 1991, 17:32499 (R;DK)
Systems Analysis Department. Annual progress report 1991, 17:31050 (R;DK)
ROAD TRANSPORT
Analysis of advantages to be gained by users through utilizing SAFECOM CL computers in lorries, 17:31121 (I;DK;In Danish)
LASTCOMP - electronic data processing for transportation by lorries, 17:31122 (I;DK;In Danish)
LASTCOMP - electronic data processing for transportation by lorries: Final report, 17:31120 (I;DK;In Danish)
Simulation and intelligent vehicle highway systems, 17:31119 (R;US)
ROBOTS
Intelligent perception control based on a blackboard architecture, 17:31347 (R;FR)
Path tracking control of mobile robots with techniques based on the use of curved abscissa, 17:31348 (R;FR;In French)
RATLER: Robotic All-Terrain Lunar Exploration Rover, 17:31365 (R;US)
Sensor-based whole-arm obstacle avoidance for unstructured environments, 17:31354 (R;US)
ROCK SALT
See SALT DEPOSITS
ROCKET ENGINES
A smoke producing rocket motor for atmospheric wind profiling, 17:31627 (R;US)
ROCKETS
Study of wall heat transfer from a high temperature dissociated hydrogen impinging jet, 17:31160 (R;US)
ROCKS
See also METAMORPHIC ROCKS
Hydrology and Radionuclide Migration Program: 1989 progress report, 17:31746 (R;US)
Mechanics of inhomogeneous rock: The two-constituent porous medium paradigm, 17:31281 (R;US)
Numerical calculations on heterogeneity of groundwater flow, 17:31759 (R;SE)
Recent advances in methods for measuring the dynamic response of geological materials to 100 GPa, 17:32016 (R;US)
Redox capacity of crystalline rocks - laboratory studies under 100 bar oxygen gas pressure, 17:30751 (R;FI)
Site characterization and validation - monitoring of head in the Stripa mine during 1991, 17:31737 (R;SE)

ROCKY FLATS PLANT
Development of location criteria for criticality alarm detector placements, 17:31362 (R;US)
RFEDSCHK User's Manual (The RFEDS Lab Data Check routine), Environmental and Scientific Systems Information Resources: Version 1.00, 17:32561 (R;US)
Summary of a graded approach to fire hazard analysis, 17:30762 (R;US)
RODS (CONTROL)
See CONTROL ELEMENTS
RODS (FUEL)
See FUEL RODS
ROOFS
WIPP supplementary roof support system, Room 1, Panel 1: Geotechnical field data analysis bi-annual report, 17:30678 (R;US)
RUBIDIUM
Demonstration of a neon-like rubidium x-ray laser, 17:31424 (R;US)
Experiments on resonantly photo-pumped x-ray lasers, 17:31423 (R;US)
RUMEN
See RUMINANTS
RUMINANTS
See also CATTLE
Animal production and health newsletter. No 16, 17:31865 (I;XA)
RUTHENIUM
Heteropolyanions: Soluble precatalysts for quinoline hydrogenation, 17:30428 (R;US)
Sulfided heterogeneous, bimetallic RuMo catalysts derived from mixtures of $Ru_3(CO)_{12}$ (or $RuCl_3$) and a molybdenum heteropolyanion. The reactions of ethanol with tetrahydroquinoline, 17:30429 (R;US)
RUTHERFORD SCATTERING
Application of the Rutherford backscattering analysis (RBS analysis) for detecting heavy impurity elements in pBN crucible materials. Final report, 17:31298 (I;DE;In German)
RWE-BAYERNWERK REACTOR
Accelerated irradiation test of gundremmingen reactor vessel trepan material, 17:30878 (R;US)

S

S CODES
SADDE-MOD1: Scaled absorbed dose distribution evaluator, 17:32542 (CM;US)
SAGEWASP: Optimal electric utility expansion, 17:32524 (CM;US)
SKYSHINEIII: Calculating effects of structure design on neutron dose rates in air, 17:32545 (CM;US)
SUBDOSA: External dose airborne radionuclides, 17:32535 (CM;US)
SWEB: Scientific Workstation Evaluation Benchmark, 17:32523 (CM;US)
Simplified modeling and code usage in the PASC-3 code system by the introduction of a programming environment: Contribution to 'International Conference on Nuclear Criticality Safety-INC'91', Oxford, UK, 9-13 September 1991, 17:32517 (R;NL)
S-1000 RESONANCES
See MESONS
SAFETY
See also REACTOR SAFETY
Level 1 probabilistic safety assessment on swimming pool reactor at IAE, 17:30971 (R;CN)
Overview of severe accident research in Japan, 17:31012 (RA;JP)
SAFETY (NUCLEAR)
See RADIATION PROTECTION
SAFETY (REACTOR)
See REACTOR SAFETY
SAFETY ANALYSIS
A graded approach to safety documentation at processing facilities, 17:30764 (R;US)
SAFETY RODS
See SCRAM RODS
SALINE ZONE
See OIL SHALES
PICEANCE CREEK BASIN
SALMON
Rock Island Dam smolt monitoring, 1991, 17:30819 (R;US)
South Fork Clearwater River habitat enhancement - Nez Perce National Forest, 17:30818 (R;US)
Umatilla Satellite and Release Sites Project: Final siting report, 17:30817 (R;US)
SALMONELLA
The effect of the anoxic radiosensitizing agent Tan on induction of revertants by γ-rays and helium ions in salmonella tester strains, 17:31982 (R;SU)
SALT DEPOSITS
Progress report of the 600 m borehole project of the CEC programme on management and storage of radioactive waste: January-June 1991, 17:30679 (R;NL)
Steady-state saturation profiles for linear immiscible fluid displacement in porous media, 17:30720 (R;US)
SALTS
Thermal analysis of alkylammonium salts, 17:31269 (R;US)
SAMARIUM COMPLEXES
Synthesis, characterization and reactivity of some lanthanide organometallics, 17:31316 (R;FR;In French)
SAMPLE HOLDERS
Sample holder for x-ray diffractometry, 17:31600 (PA;US)
SAMPLE PREPARATION
Innovative methods for inorganic sample preparation, 17:31286 (R;US)
SANDIA LABORATORIES
Energy and Environment, August 1992: A Sandia Technology Bulletin, 17:31062 (R;US)
Nuclear Security Systems Center, 17:30775 (R;US)
Transportation Systems Center, 17:30647 (R;US)
SANDSTONES
Fluid diversion and sweep improvement with chemical gels in oil recovery processes: Final report, 17:30567 (R;US)
Multiwell Experiment final report: 4, The fluvial interval of the Mesaverde Formation, 17:30586 (R;US)
Visualization of foam/oil in a new, high resolution, sandstone replica micromodel, 17:30568 (R;US)
SANITARY LANDFILLS
A study of working conditions at biogas extraction, garbage sorting, and handling of hazardous wastes, 17:30815 (R;SE;In Swedish)
Effect of season, substrate composition, and plant growth on landfill leachate treatment in a constructed wetland, 17:31691 (R;US)
SANTA MARIA DE GARONA NUCLEAR POWER PLANT
See GARONA REACTOR
SANTA MARIA DE GARONA POWER REACTOR
See GARONA REACTOR
SAPHIR REACTOR
Irradiation techniques employed at the 10 MW_{th} SAPHIR reactor, 17:30995 (R;CH)
SAVANNAH RIVER PLANT
A graded approach to safety documentation at processing facilities, 17:30764 (R;US)
Effluent versus inlet header break analysis for SRS-reactor LOPA scenario, 17:30950 (R;US)
Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector, 17:31748 (R;US)
Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
Independent technical review of Savannah River Site Defense Waste Processing Facility technical issues, 17:30662 (R;US)
Savannah River Site computing standards and guidelines reference, 17:32569 (R;US)
Technical Section Coordinating Committee meeting, 17:30978 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)

SAVANNAH RIVER PLANT C REACTOR
See C REACTOR

SAVANNAH RIVER PLANT K REACTOR
See K REACTOR

SAVANNAH RIVER PLANT L REACTOR
See L REACTOR

SAVANNAH RIVER PLANT P REACTOR
See P REACTOR

SAVANNAH RIVER PLANT R REACTOR
See R REACTOR

SCALAR FIELDS
A theoretical kinematical study of the gradient of any cosmic scalar field, 17:32074 (R;XA)
Variational principle in stochastic quantization and 1/N expansion, 17:32072 (R;FR)

SCANDIUM 46
Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)

SCANNERS (OPTICAL)
See OPTICAL SCANNERS

SCATTERING
See also ELASTIC SCATTERING
MULTIPLE SCATTERING
A caution on reliability using "optimal" variance reduction parameters, 17:32349 (R;US)
Algorithm of numerical calculations of differential Yakubovsky equations for the (1+3) scattering problem, 17:32035 (R;SU;In Russian)
Measurement of spin-dependent electron scattering from a polarized ^{3}He internal target, 17:32263 (RA;FR)
Scattering problem with complex potential as a problem with zero boundary values and its solution with finite element method, 17:32091 (R;SU;In Russian)

SCATTERING AMPLITUDES
Green function and scattering amplitudes in many dimensional space, 17:32029 (R;FR)

SCHROEDINGER EQUATION
'Schroedinger equations' of higher (>2) order, 17:32033 (R;SU;In Russian)
Generalization of Schroedinger equation to the Boltzmann phase space, 17:32039 (R;SU;In Russian)
Moment problem formulation of the Schroedinger equation, 17:32019 (R;FR)
On the invariant measure for the nonlinear Schroedinger equation, 17:32031 (R;SU)
Semiclassical quantization of multidimensional systems, 17:32027 (R;FR)
The system whose Hamiltonian is a time-dependent quadratic form in coordinates and momenta, 17:32101 (R;SU)

SCHWINGER FUNCTIONAL EQUATIONS
Newtonian iterative scheme for solving Schwinger-Dyson equation for a quark, 17:32145 (R;SU)

SCIENTIFIC PERSONNEL
Evolution of the scientific paper, 17:32571 (R;US)

SCINTILLATION CHAMBERS
See SCINTILLATION COUNTERS

SCINTILLATION COUNTERS
See also SOLID SCINTILLATION DETECTORS
Study of characteristics of flat scintillation detectors with a fiber optics light guide for the multilayer charged-particle ΔE-spectrometer, 17:31572 (RA;SU;In Russian)
Wide aperture scintillation hodoscope with FEU-85, 17:31568 (R;SU;In Russian)

SCINTILLATION DETECTORS
See SCINTILLATION COUNTERS

SCOTLAND
See UNITED KINGDOM

SCRAM RODS
Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
Heat flux limits for control and safety rods, 17:31006 (R;US)

SEA BED
Involvement of fluids in regional metamorphism: A preliminary study of carbonate isotope compositional profiles on Sifnos (Cyclydes, Greece), 17:31711 (IA;IL)

SEALED SOURCES
Development of ^{60}Co after-loading source, 17:30786 (R;CN;In Chinese)

SEALING MATERIALS
α-sealed transfer device and portable plastic film sealers, 17:31349 (R;CN;In Chinese)
Research on backfilling and sealing of Rooms and Galleries in a repository in salt, 17:30696 (R;FR;In German)

SEALS
See also GASKETS
Comprehensive research on sealing behaviour of reactor vessel of 300 MWe nuclear power plant, 17:30880 (R;CN;In Chinese)
Sealing performance of bentonite and bentonite/crushed rock borehole plugs, 17:30710 (R;US)

SEAS
See also ATLANTIC OCEAN
BALTIC SEA
CASPIAN SEA
Noninvasive probing of the ocean surface using laser-based nonlinear optical methods, 17:32015 (R;US)

SEBACEOUS GLANDS
See SKIN

SECOND QUANTIZATION
Second quantization in bit-string physics: Revision, 17:32047 (R;US)

SECONDARY BATTERIES
See ELECTRIC BATTERIES

SECONDARY COOLANT CIRCUITS
Comparative analysis of quality assurance requirements for selected LMFBR components of classes 1, 2 and 3, 17:30912 (R;FR)

SECONDARY RECOVERY
See ENHANCED RECOVERY

SECTOR CYCLOTRON
See ISOCHRONOUS CYCLOTRONS

SECURITY
Safeguards technology and computer security training, 17:30770 (R;US)
The problem with security: Public perception versus reality, 17:32485 (R;US)

SEDIMENTS
Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Evaluation of ^{137}Cs in pond sediment with an underwater HPGe detector, 17:31748 (R;US)
Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)
Use of Lagrangian methods to describe particle distribution and deposition in horizontal turbulent flows, 17:31383 (RA;US)

SEEDS
Postradiation recovery and radioresistance of seeds, 17:31958 (IA;SU;In Russian)
Using tritium oxide to study moisture transfer in drying phase of mixed dry and wet grain, 17:30788 (R;CN)

SEISMIC P WAVES
Active tectonics of the south Caspian basin and surrounding regions, 17:32017 (RA;US)

SEISMIC SOURCES
Marine geophysical studies in the Northern Atlantic with emphasis on sedimentation, crustal structure and subsidence, 17:30565 (I;NO)

SEISMIC SURVEYS
Analysis of three-component seismic data with emphasis on anisotropy, 17:30564 (I;NO)

SELENIUM
Experimental studies of x-ray laser spectral profiles: Observation of gain narrowing and saturation behavior, 17:31426 (R;US)
Selenium speciation in ground water: Quarterly report, 17:31753 (R;US)

SELENIUM 80 TARGET
A pocketful of tin isomers from heavy-ion collisions, 17:32272 (R;US)
SEMICONDUCTOR JUNCTIONS
Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992, 17:30821 (R;US)
SEROTONIN
Autoradiographic visualization on the role of central ^{3}H-5-hydroxytryptamine in acupuncture analgesia, 17:31854 (R;CN;In Chinese, English)
SERPUKHOV TEVATRON
Damping of resistive instability in UNK-1 with digital electronics in feedback, 17:31536 (R;SU;In Russian)
SHAFT EXCAVATIONS
The HADES demonstration and pilot project on radioactive waste disposal in a clay formation, 17:30687 (R;FR)
SHALE OIL
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991, 17:30600 (R;US)
SHEATHS (FUEL)
See FUEL CANS
SHELL MODELS
Perturbative many-body approaches to finite nuclei, 17:32239 (R;NO)
SHELLS (CONTAINMENT)
See CONTAINMENT SHELLS
SHF RADIATION
See RADIOWAVE RADIATION
SHIELDS
Shielding chalculations in x-rays installations for medical diagnosis. description of the method and computational solution, 17:30782 (I;CU;In Spanish)
SHIPMENT
See TRANSPORT
SHOCK WAVES
See also DETONATION WAVES
Diagnostic of shock wave processes, 17:31366 (R;US)
RHALE: A MMALE shock physics code written in C++, 17:32562 (R;US)
SHORT ROTATION CULTIVATION
Biological follow-up in short rotation cultivation on farmland, 17:30799 (R;SE;In Swedish)
Modelling of cadmium fluxes on energy crop land, 17:30812 (R;SE)
SHORT WAVE RADIATION
Nonlinear shaping of a two-dimensional ultrashort ionizing pulse, 17:32409 (R;SE)
Preliminary observations of electromagnetic radiation from plasma in presence of a double layer, 17:32436 (R;SE)
SHOWER COUNTERS
Absolute in situ energy calibration of luminosity calorimeters in the DELPHI experiment at LEP, 17:31598 (R;NO)
Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)
High resolution crystal calorimetry at LHC, 17:31584 (R;FR)
Investigation of two-track resolution efficiency of the VKD vertex detector using simulation of p-barp interactions at 6 TeV, 17:31573 (R;SU;In Russian)
[Calorimeter based detectors for high energy hadron colliders]: [Progress report], 17:31549 (R;US)
[Effects of ionizing radiation on scintillators and other particle detectors]: Conference summary, 17:31541 (R;US)
[Elementary particle physics research]: Final report, [1 January 1991–31 January 1992], 17:32068 (R;US)
SI SEMICONDUCTOR DETECTORS
Development of high resolution double-sided silicon detectors with projective readout, 17:31548 (R;FR;In French)
SIRI - A proposal for a multi-detector ΔE-E particle telescope, 17:31599 (R;NO)
The Argonne silicon strip-detector array, 17:31540 (R;US)
SIALON
See ALUMINIUM OXIDES
SILICON NITRIDES
SIDERITE
Pressurized fluidized-bed hydroretorting of eastern oil shales: Volume 2, Task 3, Testing of process improvement concepts: Final report, September 1987–May 1991, 17:30600 (R;US)
SIGMA MODEL
Anomaly-free gauges in superstring theory and double supersymmetric sigma-model, 17:32098 (R;SU)
SIGMA-410 RESONANCES
See SIGMA MODEL
SIGNALS
Studies on signal validation and sensor surveillance for in-core signals in NPP: Paper presented at the NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment, Pittsburg, Pennsylvania, USA, 1-4 October 1991, 17:30961 (R;NL)
SILICA
See SILICON OXIDES
SILICEOUS ROCK
See SANDSTONES
SILICON
Atomistic processes of surface segregation during Si-Ge MBE growth, 17:31268 (R;US)
Irradiation techniques employed at the 10 MW$_{th}$ SAPHIR reactor, 17:30995 (R;CH)
Measurements of crystal growth kinetics at extreme deviations from equilibrium: Technical progress report, 1 September 1990–31 August 1991, 17:31270 (R;US)
Microscopic origins of metastable effects in a-Si:H and deep defect characterization in a-Si,Ge:H alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30822 (R;US)
Silicide layer growth rates in Mo/Si multilayers, 17:31244 (R;US)
The technology and application study of NTD CZ silicon for pressure sensing elements, 17:31602 (R;CN;In Chinese)
Uses of Monte Carlo computer simulations in understanding epitaxial growth and ion bombardment of Si(001), 17:31278 (R;US)
SILICON 28 REACTIONS
Baryon and pion distributions from nucleus-nucleus collisions at 15 GeV/nucleon, 17:32287 (IA;DE)
SILICON ALLOYS
Influence of dilute impurities on the evolution of defect cascades in nickel, 17:31201 (R;US)
Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30823 (R;US)
SILICON NITRIDES
Cost-effective sintered reaction-bonded silicon nitride (SRBSN) for structural ceramics, 17:31254 (R;US)
SILICON OXIDES
Mechanism of surface enrichment and adhesion of coal combustion particulates: Second quarterly report, September 1987, 17:30549 (R;US)
Preparation, optical and laser properties of Nd-doped sol-gel silica, 17:32476 (R;US)
SILICON SEMICONDUCTOR DETECTORS
See SI SEMICONDUCTOR DETECTORS
SIMS
See MASS SPECTROSCOPY
SIMULATORS
An analog macromodel of the SG1525A PWM for use with SPICE2G.6 simulators, 17:31416 (R;US)
SINGLE CRYSTALS
See MONOCRYSTALS
SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY
SPECT assay of radiolabeled monoclonal antibodies: Comprehensive progress report, September 1989–February 1992, 17:31778 (R;US)
SPECT assay of radiolabeled monoclonal antibodies: Third yearly progress report, September 1991–February 1992, 17:31777 (R;US)
SITE REHABILITATION
See REMEDIAL ACTION

SITE SELECTION
An overview of IPSN research on the evolution of the natural systems in support of the French methodology for the safety evaluation of radwaste disposal in deep geological formations, 17:30658 (R;FR)

SITES (REACTOR)
See REACTOR SITES

SKELETON
^{153}Sm-EDTMP and ^{99m}Tc-EDTMP - The radiopharmacology of two potential bone metastasis radiopharmaceuticals, 17:31914 (RA;US)
A model for electron and beta energy deposition within trabecular bone, 17:31895 (RA;US)
A new approach to radiopharmaceutical dose assessment, 17:31882 (RA;US)
Complexes of technetium-99m with phosphomycine obtained by pH shifting: Biological characteristics, whole-body autoradiography, Γ-camera study, 17:31828 (RA;US)
Evaluation of multiple-dose ^{153}Sm-EDTMP for bone pain palliation in cancer patients, 17:31787 (RA;US)
Radiopharmacology of inhaled Xe-133 in skeletal sites containing deposits of Gaucher cells, 17:31795 (RA;US)

SKIN
See also HAIR
VARSKIN: Dose calculation of contamination of the skin, 17:32543 (CM;US)

SLAGS
The optical properties of high temperature slag, 17:30463 (RA;US)

SLC
See STANFORD LINEAR COLLIDER

SLEEVES
History and current status of Generation 3 thermal sleeves in Westinghouse nuclear power plants, 17:30897 (R;US)

SLUDGES
Developments in geothermal waste treatment biotechnology, 17:30853 (R;US)

SLUGS (FUEL)
See FUEL RODS

SLURRIES
See also FUEL SLURRIES
Dynamical simulations of sedimentation, 17:30533 (RA;US)
Using the refractive index matched technique to study the flow properties of slurries, 17:30521 (RA;US)
Visualization of the wall-slip layer in bounded flows of suspensions, 17:30522 (RA;US)

SLURRIES (FUEL)
See FUEL SLURRIES

SLURRY PIPELINES
Dynamic simulation of pressure driven suspension flow, 17:30532 (RA;US)
Method and apparatus for transporting liquid slurries, 17:30536 (PA;US)

SNAKE RIVER PLAIN
Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)

SODIUM 22
^{22}Na and ^{26}Al production in nova outbursts, 17:32060 (R;US)
Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)

SODIUM 24
Determination of neutron dose from criticality accidents with bioassays for Na-24 and P-32, 17:31993 (RA;US)
Investigation of β-ν angular correlation in decay of ^{24}Na nuclei, 17:32249 (R;SU)

SODIUM CHLORIDES
Jain-Lidiard model calculations of radiation damage in sodium chloride: Presented at the Conference REI'6 (Radiation Effects in Insulators-6), June 24-28, 1991, Weimar, Germany, 17:31271 (R;NL)

SODIUM MINERALS
See MINERALS

SOFC
See SOLID ELECTROLYTE FUEL CELLS

SOFT SOLDERING
See SOLDERING

SOFT X RADIATION
The ALEXIS experiment: Current status and performance, 17:32054 (R;US)

SOILS
Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Comparison of acid leachate and fusion methods to determine plutonium and americium in environmental samples, 17:31287 (R;US)
Corrective Action Plan for underground storage tanks 0439-U, 0440-U, 2073-U, 2074-U, and 2075-U at the East End Fuel Station, Buildings 9754 and 9754-2, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Facility ID No. 0-010117, 17:30753 (R;US)
Effects of lag and maximum growth in contaminant transport and biodegradation modeling, 17:31727 (R;US)
Soil acidification and element fluxes as related to tree species in deciduous forests of south Sweden, 17:31725 (R;SE)
Subsurface Science Program Bibliography, 1985–1992, 17:32008 (R;US)
Three-dimensional bioremediation modeling in heterogeneous porous media, 17:31728 (R;US)

SOLAR ARCHITECTURE
Solar building study. Final report: Spinney Gardens [Crystal Palace, London], 17:30826 (R;GB)

SOLAR CELLS
Microscopic origins of metastable effects in a-Si:H and deep defect characterization in a-Si,Ge:H alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30822 (R;US)
Recombination and metastability in amorphous silicon and silicon germanium alloys: Annual subcontract report, 1 February 1991–31 January 1992, 17:30823 (R;US)
Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992, 17:30821 (R;US)

SOLAR CONCENTRATORS
Mirror alignment techniques for point-focus solar concentrators, 17:30830 (R;US)

SOLAR DISTRICT HEATING
Seasonal storage of solar heating at Nynaeshamn, 17:30831 (R;SE;In Swedish)

SOLAR ENERGY
Life cycle cost analysis of solar heating and DHW systems in residential buildings, 17:30820 (R;FR)

SOLAR HEATING SYSTEMS
Solar heating system for the combined space heating of and domestic hot water: Development of a competitive system. Calculations and measurements in relation to the test plant, 17:30825 (R;DK;In Danish)

SOLAR-ASSISTED POWER SYSTEMS
Optimizing of a photovoltaic system for supplying a residential with electricity, 17:30824 (R;SE)

SOLDERING
Radar operations process waste assessment: Solder pot tinning, 17:31132 (R;US)

SOLID ELECTROLYTE FUEL CELLS
Alternative materials for solid oxide fuel cells: Factors affecting air-sintering of chromite interconnections, 17:31088 (R;US)
Jet vapor deposition of thin films for solid oxide and other fuel cell applications, 17:31081 (R;US)
Perovskite solid electrolytes for SOFC, 17:31080 (R;US)
Solid oxide fuel cell processing using plasma arc spray deposition techniques: Final report, 17:31083 (R;US)

SOLID SCINTILLATION DETECTORS
See also PLASTIC SCINTILLATION DETECTORS
Radiation damage in cesium iodide and other scintillating crystals, 17:31542 (R;US)

SOLID WASTES
See also WOOD WASTES

Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Preliminary assessment of RTR and visual characterization for selected waste categories, 17:30716 (R;US)
Survey of EEC solid waste arisings and performance of nondestructive assay systems, 17:30695 (R;FR)

SOLIDS
Conceptual design for the Waste Receiving and Processing facility Module 2A: Conceptual Design Report: Volume 1, 17:30675 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: Outline specifications: Volume 3, 17:30676 (R;US)
Conceptual design for the Waste Receiving and Processing facility Module 2A: System descriptions: Volume 5, 17:30677 (R;US)
Studies of granular flow down an inclined chute: Quarterly technical progress report, March 13, 1992–June 12, 1992, 17:30535 (R;US)

SOLUBILITY
The influence of organic complexing agents upon the mobilization and migration of radionuclides from ILW contained in cement and bitumen under nearfield conditions for a repository in a salt dome, 17:30694 (R;FR)

SOLUTES
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

SOLUTIONS
See also AQUEOUS SOLUTIONS
LEACHATES
PROCESS SOLUTIONS
Chemical potentials in dilute, multicomponent solutions, 17:31311 (R;US)

SOLVENTS
Chemical potentials in dilute, multicomponent solutions, 17:31311 (R;US)

SOMATOSTATIN
Technetium labelled somatostatin a potential agent for in vivo tumor localization, 17:31791 (RA;US)

SOMATOTROPIN RELEASE INHIBITING FACTOR
See SOMATOSTATIN

SOOT
Soot and fuel distribution imaging in a diesel engine, 17:31157 (R;US)

SORBENT INJECTION PROCESSES
Selected characteristics of twelve clean coal technologies, 17:31070 (RA;US)
Technology descriptions and demonstrations, 17:30419 (RA;US)

SOUTH KOREA
See REPUBLIC OF KOREA

SOUTHERN NEGROS GEOTHERMAL FIELD
See PALIMPINON GEOTHERMAL FIELD

SOVIET UNION
See USSR

SPACE FLIGHT
Space Shuttle dosimetry measurements with RME-III, 17:31597 (RA;US)

SPACE HVAC SYSTEMS
The utilization of building maintenance feedback in Hepac-design, 17:31113 (R;FI;In Finnish)

SPACE PROPULSION REACTORS
A computer program for engineering simulations of space reactor system performance, 17:30916 (R;US)
A development approach for nuclear thermal propulsion, 17:30914 (R;US)
Ground test facility for SEI nuclear rocket engines, 17:30917 (R;US)

SPACE VEHICLES
Applications of the Los Alamos High Energy Transport code, 17:32348 (R;US)

SPACE-TIME
From the Weyl theory to a theory of locally anisotropic space-time, 17:32099 (R;SU)

SPALLATION
Pauli blocking and dynamical multifragmentation calculations, 17:32257 (IA;DE)
Spatial distribution of radionuclides produced by photonuclear reactions, 17:32336 (RA;JP;In Japanese)
Surface multifragmentation investigated with a finite temperature spherical TDHF model, 17:32258 (IA;DE)

SPARTICLES
Search for new particles in the SUSY framework, 17:32169 (R;FR)
Searches for new particles at LEP, 17:32197 (R;FR)

SPECIAL PRODUCTION REACTORS
See also C REACTOR
K REACTOR
L REACTOR
P REACTOR
R REACTOR
Countercurrent flow-limiting characteristics of a Savannah River Plant control rod septifoil, 17:31011 (R;US)
Heat flux limits for control and safety rods, 17:31006 (R;US)
Intergranular stress corrosion cracking: A rationalization of apparent differences among stress corrosion cracking tendencies for sensitized regions in the process water piping and in the tanks of SRS reactors, 17:30996 (R;US)
Thermal hydraulic performance of naturally aspirated control rod housing assemblies, 17:31034 (R;US)

SPECIAL RELATIVITY THEORY
See RELATIVITY THEORY

SPECIFIC GRAVITY
See DENSITY

SPECIFIC HEAT
Development for specific heat measuring apparatus of high T_c superconductor in 80 $\approx$ 200 K temperature range, 17:32383 (R;CN;In Chinese)

SPECIFIC VOLUME
See DENSITY

SPECIFIC WEIGHT
See DENSITY

SPECIFICATIONS
Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)

SPECIMEN HOLDERS
See SAMPLE HOLDERS

SPECTRA (NEUTRON)
See NEUTRON SPECTRA

SPECTROMETERS
See also ALPHA SPECTROMETERS
MAGNETIC SPECTROMETERS
MASS SPECTROMETERS
MULTIPARTICLE SPECTROMETERS
A short-orbit spectrometer for Hall C, 17:31471 (R;US)
Setup for separation and investigation of β-n decay of neutron-rich nuclei, 17:31576 (R;SU;In Russian)

SPECTROPHOTOMETERS
Variable path length spectrophotometric probe, 17:31611 (PA;US)

SPECTROSCOPY
See also GAMMA SPECTROSCOPY
ION SPECTROSCOPY
MASS SPECTROSCOPY
X-RAY SPECTROSCOPY
Analysis of IMS spectra using neural networks, 17:31318 (R;US)

SPENT FUEL ELEMENTS
Conceptual design of fixed bed burning system: A study of the head-end process for Th-U nuclear fuel cycle in HTGR, 17:30639 (R;CN;In Chinese)
Investigations concerning the exchange of iodine from nonvolatile organic iodine compounds. Final report, 17:30641 (I;DE;In German)
Leaching process of nuclear fuel in leaching solution at subboiling temperature, 17:30638 (R;CN;In Chinese)

SPENT FUEL STORAGE
Sample Vial Secure Container (SVSC), 17:30648 (R;US)

SPENT FUELS
Application of a safeguards radiation measurement system to the screening of spent fuel assemblies for transport and storage, 17:30646 (R;US)
Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)
Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B, Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, S, 17:30902 (R;US)
Foreign experience in extended dry storage of spent nuclear fuel, 17:30713 (R;US)
Molten salt/metal extractions for recovery of transuranic elements, 17:30654 (R;US)
Source term models for the release of radionuclides from used nuclear fuel, 17:30726 (RA;SE)
Spent fuel characteristics for TVO-92 safety analysis, 17:30879 (R;FI;In Finnish)
Validating criticality calculations for spent fuel with ^{252}Cf-source-driven noise measurements, 17:31352 (R;US)
SPENT LIQUORS
Black liquor gasification: Consequences for pulping process and energy balance, 17:31139 (R;SE)
The fermentation of lignocellulose hydrolysates with xylose isomerases and yeasts, 17:30802 (R;SE)
SPERM
See SPERMATOZOA
SPERMATIDS
See SPERMATOZOA
SPERMATOZOA
Study on the retention of enriched UO_2F_2 in the mouse and its radiogenotoxicological effects, 17:31876 (R;CN;In Chinese)
SPIN
On the check-up of the violation of the relativity principle by the investigation of the local properties of spin precession of relativistic electrons conducted at the storage ring, 17:31531 (R;SU;In Russian)
Spin observables in the $pp \to pK^+Y$ reactions at Saturne, 17:32154 (R;FR)
SPIN FLIP
A signature for isoscalar-spin transitions in (d,d') scattering at intermediate energy, 17:32314 (R;FR)
SPINOR SYMMETRY
See BOSON-FERMION SYMMETRY
SPONTANEOUS COMBUSTION
The production of a premium solid fuel from Powder River Basin coal, 17:30421 (R;US)
SPRAY DRYING
LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)
LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)
STAGED COMBUSTION
Formation and destruction of nitrogen oxides in coal combustion: Second quarterly report, April 1, 1988–June 30, 1988, 17:30544 (R;US)
STAINLESS STEEL-18-4-1
See STAINLESS STEELS
STAINLESS STEEL-19-9DL
See STAINLESS STEELS
STAINLESS STEEL-304
Elevated temperature tensile properties of borated 304 stainless steel: Effect of boride dispersion on strength and ductility, 17:31240 (R;US)
Evaluation of liquid metal embrittlement of SS304 by Cd and Cd-Al solutions, 17:31036 (R;US)
Intergranular stress corrosion cracking: A rationalization of apparent differences among stress corrosion cracking tendencies for sensitized regions in the process water piping and in the tanks of SRS reactors, 17:30996 (R;US)
Thermal stress and strain analysis in traveling autogenous welds, 17:31363 (R;US)
STAINLESS STEEL-304L
Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
STAINLESS STEEL-316
Influence of cold work level on the irradiation creep and creep rupture of titanium-modified austenitic stainless steels, 17:31237 (R;US)
STAINLESS STEEL-316L
Stress corrosion cracking of candidate waste container materials: Final report, 17:30653 (R;US)
STAINLESS STEEL-Z2CND17-12
See STEEL-CR17NI12MO3-L
STAINLESS STEEL-Z3CND17-12
See STEEL-CR17NI12MO3-L
STAINLESS STEEL-Z6CNT18-10
See STEEL-CR18NI10TI
STAINLESS STEEL-Z8CNT18-10
See STEEL-CR18NI10TI
STAINLESS STEELS
See also CHROMIUM STEELS
Expansive-graphite-sandwiched spiral-wound stainless steel gasket applied to manhole sealing joints of nuclear equipment, 17:31267 (R;CN;In Chinese)
LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF startup experiments: Volume 2, 17:31020 (R;US)
Neutron metrology in the HFR: Steel irradiation R139-584/585/586, 17:31225 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-587/588/589, 17:31226 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-594/595/596, 17:32450 (R;NL)
STANDARDS
Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
STANDING CROP
See BIOMASS
STANFORD LINEAR COLLIDER
3-dimensional bundle adjustments in industrial metrology: A comparison, 17:31525 (R;US)
A simple model for SLC positron stability issues, 17:31464 (R;US)
Polarized electron sources for linear colliders, 17:31524 (R;US)
Review of SLC performance, 17:31441 (R;US)
SLAC modulator operation and reliability in the SLC Era, 17:31526 (R;US)
STAR CLUSTERS
Dynamical mass estimates in M13, 17:32056 (R;US)
STARS
See also NEUTRON STARS
Are some of the luminous high-latitude stars accretion-powered runaways?, 17:32053 (R;US)
STATE GOVERNMENT
America's best: Outstanding state energy grant projects, 17:31064 (R;US)
STEADY-STATE FUSION REACTORS
Comparison between a steady-state fusion reactor and an inductively driven pulse reactor, 17:32463 (R;JP)
STEAM GENERATORS
9Cr-1Mo martensitic alloys: effects of the nitrogen, niobium and vanadium additions on the microstructure, phase transformations and mechanical properties, 17:31211 (R;FR;In French)
A new corrosion testing facility with heat flux caused surface boiling conditions, 17:31212 (R;CN;In Chinese)
Analysis of cracks and fractography on steam generator tubes, 17:30890 (R;CN;In Chinese)
Using helium mass-spectrometer leak detector to detect the leak of vaporizer in Qinshan nuclear power plant, 17:30885 (R;CN;In Chinese)
STEAM INJECTION
A three-dimensional laboratory steam injection model allowing in situ saturation measurements, 17:30569 (R;US)
STEEL INDUSTRY
See METAL INDUSTRY

STEEL-000KH25
See STAINLESS STEELS
STEEL-000KH28
See STAINLESS STEELS
STEEL-00KH20N32T
See STAINLESS STEELS
STEEL-03KH13AG13
See STAINLESS STEELS
STEEL-08KH18N10T
See STEEL-CR18NI10TI
STEEL-0KH18G8N2T
See STAINLESS STEELS
STEEL-0KH18N10T
See STEEL-CR18NI10TI
STEEL-12KH2MV8FB
See STEELS
STEEL-12KH2V5FB
See STEELS
STEEL-18MNV6
See STEELS
STEEL-1KH12V2MF
See CHROMIUM STEELS
STEEL-1KH18N10T
See STEEL-CR18NI10TI
STEEL-9KHS
See CHROMIUM STEELS
STEEL-ASTM-A533-B
Shallow-crack toughness results for reactor pressure vessel steel, 17:31218 (R;US)
STEEL-CR17NI12MO3-L
See also STAINLESS STEEL-316L
Improving the properties of stainless steel electron-beam welds by laser treatment, 17:31213 (R;CN;In Chinese)
Neutron metrology in the HFR: Steel irradiation R139-416, 17:30982 (R;NL)
Study of zirconium/stainless steel interface in tubular junctions made by eutectic diffusion, 17:31205 (R;FR)
STEEL-CR18NI10TI
Experiments to study the erosive effect of oxide casting streams on structures, 17:31234 (R;DE;In German)
STEEL-CR19NI10
See also STAINLESS STEEL-304
Improving the properties of stainless steel electron-beam welds by laser treatment, 17:31213 (R;CN;In Chinese)
STEEL-DIN-1-6310
See STEEL-MNNIMO
STEEL-DIN-1-6343
See STEEL-MNNIMO
STEEL-KH13S2YU2BT
See CHROMIUM STEELS
STEEL-KH18N10T
See STEEL-CR18NI10TI
STEEL-MNNIMO
Neutron irradiation test of the S271 steel, 17:31214 (R;CN;In Chinese)
STEEL-R18
See CHROMIUM STEELS
STEELS
See also AUSTENITIC STEELS
FERRITIC STEELS
LOW ALLOY STEELS
MARTENSITIC STEELS
Numerical simulations of steel plate perforation, 17:31241 (R;US)
Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)
Supercritical CO_2 cleaning for waste minimization, 17:31638 (R;US)
STOCHASTIC COOLING
Bunched beam stochastic cooling, 17:31446 (R;US)
STORAGE (SPENT FUEL)
See SPENT FUEL STORAGE
STORAGE (WASTES)
See WASTE STORAGE
STORAGE BATTERIES
See ELECTRIC BATTERIES
STORAGE FACILITIES
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)
STORAGE RINGS
See also BROOKHAVEN RHIC
LEP STORAGE RINGS
PEP STORAGE RINGS
SERPUKHOV TEVATRON
SUPERCONDUCTING SUPER COLLIDER
TRISTAN STORAGE RINGS
Beam diagnostic instruments of TARN II, 17:31537 (RA;JP)
Dissipative particle dynamics in ee-bar storage rings in the presence of linear synchro-betatron coupling, 17:31534 (R;SU)
JINR Tau-charm factory design considerations, 17:31533 (R;SU)
STRAND BREAKS
Microdosimetrical calculations of the rate of repairable DNA - double strand breaks based on a model for the interpretation of experiments with different doses and radiation qualities, 17:31967 (RA;SU)
STRANGE BARYONS
See HYPERONS
STRANGE MESONS
See also KAONS
$\eta, K_L \rightarrow \pi^+\pi^-\gamma$ as tests of chiral models, 17:32177 (R;FR)
STRANGENESS
Strangeness production in the $pp \rightarrow pK^+Y$ and $pA \rightarrow pK^+X$ reactions at Saturne, 17:32153 (R;FR)
STRATEGIC PETROLEUM RESERVE
Procurement activities at the Strategic Petroleum Reserve, 17:30584 (R;US)
US Department of Energy Naval Petroleum Reserves combined financial statement, 17:30583 (R;US)
STRENGTH (FRACTURE)
See FRACTURE PROPERTIES
STRENGTH FUNCTIONS
From experimental monopole cross-sections to nuclear incompressibilities, 17:32219 (R;FR)
STRING MODELS
See also SUPERSTRING MODELS
A new exact solution to the classical equations of motion of the relativistic string with massive ends, 17:32104 (R;SU)
Anomaly-free gauges in superstring theory and double supersymmetric sigma-model, 17:32098 (R;SU)
Remarks on the additional symmetries and W-constraints in the generalized KdV hierarchy, 17:32089 (R;XA)
Twisted WZW superstring solutions, 17:32071 (R;FR)
STRIPPER FOILS
See BEAM STRIPPERS
STRIPPERS
See BEAM STRIPPERS
STRONTIUM
Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)
Selective decontamination for cesium and strontium in evaporation concentrates from reprocessing plants with crown ethers by transport through supported liquid membranes, 17:30699 (R;FR;In French)
STRONTIUM 90
A study on ^{90}Sr adsorption by the soils around Qinshan and Daya Bay nuclear power plants, 17:31690 (R;CN;In Chinese)
Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)
Study on the ^{90}Sr absorption by agricultural plants grown in soil from Daya Bay and Qinshan area, 17:31875 (R;CN;In Chinese)
STRONTIUM ISOTOPES
See also STRONTIUM 90
The isotopic composition of strontium in Israeli rains, 17:31705 (IA;IL)

STRONTIUM OXIDES
Activation energy and critical current density in Bi-Sr-Ca-Cu-O, 17:31247 (R;US)
Magnetic behavior of a $Bi_2Sr_2Ca_1Cu_2O_x$ single crystal by direct magneto-optical observations, 17:31259 (R;US)
Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)
STRUCTURAL BUCKLING
See DEFORMATION
STRUCTURAL MATERIALS
See BUILDING MATERIALS
STRUCTURE (CRYSTAL)
See CRYSTAL STRUCTURE
STRUCTURES (BUILDINGS)
See BUILDINGS
STURM-LIOUVILLE EQUATION
Algorithm and program for solution of the Sturm-Liouville problem using the high order accuracy spline scheme, 17:32553 (R;SU;In Russian)
SU-2 GROUPS
On quantum groups and their potential use in mathematical chemistry, 17:32043 (R;FR)
SUBBITUMINOUS COAL
Formation and retention of methane in coal: Final report, 17:30470 (R;US)
Temperature-programmed catalytic liquefaction of low rank coal using dispersed Mo catalyst, 17:30430 (R;US)
SUBCONTRACTORS
See CONTRACTORS
SUBCOOLED BOILING
An experimental study of bubble detachment point in subcooled boiling at low pressure and velocity, 17:31381 (R;CN;In Chinese)
SUBURBS
See URBAN AREAS
SUGAWARA THEORY
General construction of the Virasoro algebra from superalgebras, 17:32116 (R;FR)
SULFATE-REDUCING BACTERIA
Biological conversion of synthesis gas: Project status report, January 1, 1992–March 31, 1992, 17:30436 (R;US)
The roles of the micro-organisms and chromium content in the corrosion of iron-chromium steels in the presence of sulfate-reducing bacteria, 17:31210 (R;FR;In French)
SULFITE WASTE LIQUOR
See SPENT LIQUORS
SULFUR 32 REACTIONS
Fluctuations of multiplicities in rapidity windows in sulphur-sulphur collisions at 200 AGeV, 17:32293 (IA;DE)
SULFUR DIOXIDE
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, December 1, 1990–February 28, 1991, 17:30477 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, March 1, 1991–May 30, 1991, 17:30478 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, June 1, 1991–August 31, 1991, 17:30479 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1991–November 30, 1991, 17:30480 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Technical progress report, September 1, 1989–March 1, 1990, 17:30481 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, June 1–August 31, 1990, 17:30476 (R;US)
Molten iron oxysulfide as a superior sulfur sorbent: Third quarter technical progress report, March 1, 1990–June 1, 1990, 17:30482 (R;US)
The role of human activity and land use change in atmospheric chemistry and air quality: Revision 1, 17:30486 (R;US)
SULFUR HYDRIDES
See HYDROGEN SULFIDES
SULFUR OXIDES
See also SULFUR DIOXIDE
Low NO_x/SO_x Burner retrofit for utility cyclone boilers: Public design report, 17:30545 (R;US)
SUM RULES
Measuring the Drell-Hearn-Gerasimov sum-rule, 17:32267 (RA;FR)
SUPER HIGH FREQUENCY RADIATION
See RADIOWAVE RADIATION
SUPERALLOYS
See HEAT RESISTING ALLOYS
SUPERCOMPUTERS
Distributed make (and more), 17:32566 (R;US)
SUPERCONDUCTING FILMS
Transport and magnetization currents in BSCCO/Ag tapes, 17:32391 (R;US)
YBCO based multilayers for optoelectronic devices, 17:31251 (R;FR)
SUPERCONDUCTING MAGNETS
Magnetic field perturbation caused by bending vibrations of a quadrupole, 17:31469 (R;US)
R and D needs and opportunities for application of space vehicle cryogenic technology to Maglev systems (Magnetic levitation), 17:31174 (RA;US)
Spectrum analysis of the power line flicker induced by the electrical test of the prototype Booster dipole, 17:31480 (R;US)
SUPERCONDUCTING MOTORS
Steady-state cooling of a high-temperature superconducting motor, 17:32392 (R;US)
SUPERCONDUCTING SUPER COLLIDER
Fully pipelined and programmable Level 1 trigger, 17:31527 (R;US)
Longitudinal beam dynamics with rf noise, 17:31468 (R;US)
Modification to footprint to accommodate an external fixed-target hall, 17:31443 (R;US)
Proceedings of the 1991 Symposium on the Superconducting Super Collider: "The Project, The Progress, The Physics", 17:31444 (R;US)
SUPERCONDUCTING WIRES
Electrical and microstructural characterization of silver sheathed high T_c superconductors wires and ribbons, 17:31249 (R;FR)
SUPERCONDUCTIVITY
Method of characterization of high temperature superconductor ceramics, 17:31252 (I;CU;In Spanish)
SUPERCONDUCTORS
See also HIGH-TC SUPERCONDUCTORS
TYPE-II SUPERCONDUCTORS
Ac losses test on Nb_3Sn strands, 17:32388 (R;NL)
Characteristic of the flux pinning at intergrain boundaries in bulk Bi-Pb-Sr-Ca-Cu-O superconductors, 17:32385 (R;CN)
Development for specific heat measuring apparatus of high T_c superconductor in 80 $\approx$ 200 K temperature range, 17:32383 (R;CN;In Chinese)
Flux creep in fluorine-doping Bi-Pb-Sr-Ca-Cu-O bulk superconductor, 17:32384 (R;CN;In Chinese)
Preparation of Y-Ba-Cu-O superconducting film above liquid nitrogen temperature, 17:32386 (R;CN;In Chinese)
SUPERCRITICAL FLOW
See TURBULENT FLOW
SUPERGRAVITY
Compensating fields and anomalies in supergravity, 17:32080 (R;XA)
SUPERHEAVY ELEMENTS
See TRANS 104 ELEMENTS
SUPERMULTIPLETS
Linear supermultiplets and non-holomorphic gauge coupling functions, 17:32119 (R;FR)
SUPERSTRING MODELS
Superstring derived standard-like models and the top quark mass hierarchy, 17:32128 (R;US)
SUPERSYMMETRIC PARTICLES
See SPARTICLES

SUPERSYMMETRY
Prospects for supersymmetry discoveries at a 500 GeV e^+e^- collider, 17:32172 (R;FR)
Search for new particles in the SUSY framework, 17:32169 (R;FR)
SUPPORTS
WIPP supplementary roof support system, Room 1, Panel 1: Geotechnical field data analysis bi-annual report, 17:30678 (R;US)
SURFACE BOILING
See SUBCOOLED BOILING
SURFACE FINISHING
Interfacial microchemical characterization needs in surface processing, 17:31143 (R;US)
Standards for burrs?, 17:31233 (R;US)
SURFACE MINING
Evaluation of radiological hazards associated with mineral sand-mining, 17:31955 (IA;CA)
Radiation safety aspects of occupational areas at a Brazilian open-pit mine, 17:30610 (IA;CA)
SURFACE WATERS
See also COASTAL WATERS
SEAS
DISPERS: Mathematical models for dispersion of radionuclides, 17:32546 (CM;US)
DISPERS: Mathematical models for dispersion of radionuclides, 17:32547 (CM;US)
Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)
SURPLUS NUCLEAR FACILITIES
Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program FY 1993–2002, 17:31027 (R;US)
SURVEILLANCE (RADIOACTIVITY)
See RADIATION MONITORING
SURVEY (RADIOACTIVITY)
See RADIATION MONITORING
SUSPENSIONS
See also SLURRIES
Coastal resuspension, 17:31684 (R;GB)
SUSPENSIONS (FUEL)
See FUEL SLURRIES
SWEAT GLANDS
See SKIN
SWEDEN
The environmental year 1991, 17:31643 (R;SE;In Swedish)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)
SWIMMING POOL REACTORS
See POOL TYPE REACTORS
SYNCHROPHASOTRONS
See SYNCHROTRONS
SYNCHROTRON OSCILLATIONS
The stability of the damper system for the coherent transverse oscillations of the beam in a synchrotron, 17:31458 (R;SU;In Russian)
SYNCHROTRON RADIATION
Anticipated radiation environmental effect from the Moscow Kaon Factory, 17:30966 (RA;US)
Development of a programmable CCD detector for imaging, real time studies and other synchrotron radiation applications, 17:31551 (R;FR;In French)
SYNCHROTRONS
See also BROOKHAVEN AGS
CERN PS SYNCHROTRON
CERN SPS SYNCHROTRON
SERPUKHOV TEVATRON
Anticipated radiation environmental effect from the Moscow Kaon Factory, 17:30966 (RA;US)
Beam monitors for rf feedback control in HIMAC synchrotron, 17:31498 (RA;JP)
Method for the beam intensity measurement in a fast-cycling synchrotron, 17:31499 (RA;JP)
SYNERGISM
The role of cellular and molecular studies in evaluation of health effects from combined radiation and chemical exposures, 17:31997 (R;US)
SYNTHESIS GAS
Biological conversion of synthesis gas: Project status report, January 1, 1992–March 31, 1992, 17:30436 (R;US)
Synthesis of octane enhancers during slurry-phase Fischer-Tropsch: Quarterly technical progress report No. 5, October 1, 1991–December 31, 1991, 17:30454 (R;US)
The MAGSORB process for bulk separation of carbon dioxide: Final report, 17:31296 (R;US)
SYRIA
Evidence for the origin of Ca in land snails living on basalts (Golan Heights) from their strontium isotopic composition, 17:31714 (IA;IL)

T

T CODES
Temporal scattering and response software users' manual: Version 2.3, 17:32065 (R;US)
T3 HORMONE
See TRIIODOTHYRONINE
TAGGED PHOTON METHOD
Tagged photon beams obtained by laser Compton scattering on electron beams, 17:32266 (RA;FR)
TAIWAN
The radiation protection experience in KSNP of Taiwan during the past decade, 17:31991 (RA;US)
TANK FARMS
See STORAGE FACILITIES
TANKS
Fiscal year 1992 program plan for evaluation of ferrocyanide in the Hanford Site waste tanks: Revision 2, 17:30739 (R;US)
Leak testing plan for the Oak Ridge National Laboratory liquid low- level waste system (active tanks): Volume 1, Regulatory background and plan approach; Volume 2, Methods, protocols, and schedules; Volume 3, Evaluation of the ORNL/LT-823DP differential pressure leak detection method: Environmental Restoration Program, 17:30645 (R;US)
Public involvement in the Hanford Double-Shell Tank waste disposal program, 17:30712 (R;US)
Regulated underground storage tanks, 17:30661 (R;US)
Underground storage tank waste characterization needs assessment workshop, 17:30740 (R;US)
TAR SAND OIL
See BITUMENS
TAU LEPTONS
See TAU PARTICLES
TAU PARTICLES
τ physics at LEP, 17:32180 (R;NO)
Heavy flavour physics at LEP, 17:32170 (R;FR)
Study of Tau lepton decays with ALEPH detector at LEP, 17:32175 (R;FR;In French, English)
TAUONS
See TAU PARTICLES
TEARING INSTABILITY
The suppression of multiple tearing modes using helical field, 17:32395 (R;CN;In Chinese)
The time-space structure evolution of tokamak plasma under the mutual interactions of tearing mode with transport process, 17:32398 (R;CN;In Chinese)
TECHNETIUM 99
Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor, 17:30685 (R;NL)
Environmental radioactivity in the North Atlantic region including the Faroe Islands and Greenland: 1988 and 1989, 17:31730 (R;DK)
Processing flowsheet for the accelerator transmutation of waste (ATW) program, 17:30707 (R;US)

TECHNICAL SPECIFICATIONS
See SPECIFICATIONS
TEETH
Atmospheric nuclear weapons test history narrated by carbon-14 in human teeth, 17:30761 (RA;US)
TELEMETRY
Design of a PCM data compressor: Final report, 17:32554 (R;US)
TELESCOPES
High frame-rate, large field wavefront sensor, 17:32064 (R;US)
The ALEXIS experiment: Current status and performance, 17:32054 (R;US)
Uniformity results of the multilayer mirrors used in the ALEXIS ultrasoft x-ray telescopes, 17:32055 (R;US)
TEMPERATURE MEASUREMENT
Refractory thermowell for continuous high temperature measurement of molten metal, 17:31609 (PA;US)
TERRESTRIAL BACKGROUND
See BACKGROUND RADIATION
TERTIARY RECOVERY
See ENHANCED RECOVERY
TEST FACILITIES
See also TONOPAH TEST RANGE
Ground test facility for SEI nuclear rocket engines, 17:30917 (R;US)
Radioactive waste package assay facility. Volume 1. Application of assay technology, 17:30688 (R;FR)
Radioactive waste package assay facility. Volume 3. Data processing, 17:30690 (R;FR)
Thermocouple calibration facility for 2900 deg C high temperature and its applications, 17:31607 (R;CN;In Chinese)
TEST REACTORS
See also FFTF REACTOR
Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)
TEST WELLS
See EXPLORATORY WELLS
TESTING (BIOLOGICAL)
See BIOASSAY
TESTING (MATERIALS)
See MATERIALS TESTING
TETRACHLOROMETHANE
See CARBON TETRACHLORIDE
TEXAS
Horizontal well site evaluations in eastern Ohio, eastern Colorado, and western Texas, 17:30591 (R;US)
TEXTOR TOKAMAK
Low energy helium implantation in evaporated nickel surfaces, 17:32470 (R;US)
TFTR DEVICE
See TFTR TOKAMAK
TFTR REACTORS
See TFTR TOKAMAK
TFTR TOKAMAK
Observation of ballooning instabilities with medium toroidal mode number in high temperature tokamak plasmas, 17:32434 (R;US)
THERAPEUTIC AGENTS
See DRUGS
THERMAL BATTERIES
Evaluation of flotation for purification of pyrite for use in thermal batteries, 17:31045 (R;US)
THERMAL CONDUCTIVITY
Measuring equipment to determine the status of polyethylene pipes, 17:31275 (R;SE;In Swedish)
THERMAL DECOMPOSITION
See PYROLYSIS
THERMAL DIFFUSION
Ross Priory workshop presentation, 17:31360 (R;US)
THERMAL FATIGUE
Structural analysis of thermal fatigue failures on rocket combustion chambers by the finite element method, 17:31407 (R;JP)
THERMAL INSULATION
Identification of building applications for a variable-conductance insulation, 17:31115 (R;US)
Insulating shutters, 17:31103 (R;DK;In Danish)
THERMAL PHOTOGRAPHY
See INFRARED THERMOGRAPHY
THERMAL POLLUTION (AIR)
See AIR POLLUTION
THERMAL POLLUTION (WATER)
See WATER POLLUTION
THERMAL RECOVERY
Oil recovery improvement through profile modification by thermal precipitation, 17:30570 (R;US)
THERMOCOUPLES
Spatial filtring and thermocouple spatial filter, 17:31605 (R;CN;In Chinese)
Thermocouple calibration facility for 2900 deg C high temperature and its applications, 17:31607 (R;CN;In Chinese)
THERMODYNAMICS
DOE Fundamentals Handbook: Thermodynamics, Heat Transfer, and Fluid Flow, Volume 1, 17:30931 (R;US)
THERMOLUMINESCENT DOSEMETERS
Dose calculation algorithm for the Department of Energy Laboratory Accreditation Program, 17:31592 (RA;US)
The minimum measurable dose of the sensitive Harshaw TLDs, 17:31589 (RA;US)
THERMOLUMINESCENT DOSIMETRY
New developments in personal dosimetry, 17:31930 (RA;IL;In Hebrew)
THERMONUCLEAR EXPLOSIONS
Approximating the r-process on earth with thermonuclear explosions, 17:31637 (R;US)
THERMONUCLEAR REACTIONS
Correlation experiments on checking the existence of low temperature nuclear fusion in titanium and zirconium deuterides, 17:32429 (R;SU)
THERMONUCLEAR REACTOR MATERIALS
Comparison of double-differential neutron emission cross sections calculated from evaluated nuclear data libraries with experimental data, 17:32462 (R;US)
Investigation of component failure rates for pulsed versus steady state tokamak operation, 17:32455 (R;US)
Isotopic tailoring with ^{59}Ni to study the effect of helium on microstructural evolution and mechanical properties of neutron-irradiated Fe-Cr-Ni alloys, 17:32466 (R;US)
Neutron metrology in the HFR: Steel irradiation R139-584/585/586, 17:31225 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-594/595/596, 17:32450 (R;NL)
Neutron metrology in the HFR: Steel irradiation R139-6551, 17:32451 (R;NL)
Neutron metrology in the HFR: Steel irradiation in the HFR R139-656, 17:30983 (R;NL)
Report on the joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups, 17:32469 (R;US)
Shielding calculations for NET: NET contract 89-226, first intermediate report, 17:32449 (R;NL)
The response of dispersion-strengthened copper alloys to high fluence neutron irradiation at 415°C, 17:32467 (R;US)
THERMONUCLEAR REACTORS
See also D-D REACTORS
D-T REACTORS
STEADY-STATE FUSION REACTORS
Status of the JEF and EFF projects: Presented at the International Conference on Nuclear Data for Science and Technology, Juelich, Federal Republic of Germany, 13-17 May 1991, 17:30940 (R;NL)
Technology and component development for a closed tritium cycle, 17:32440 (R;FR)
THERMONUCLEAR WEAPONS
See NUCLEAR WEAPONS
THERMOPILES
See THERMOCOUPLES
THERMOPLASTICS
Development of a 1000 g, 10 ms mechanical shock test capability: Final report, 17:31405 (R;US)

THIO COMPOUNDS
See ORGANIC SULFUR COMPOUNDS
THIOPHENES
See POLYCYCLIC SULFUR HETEROCYCLES
THORIUM
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)
THORON
See RADON 220
THREE-BODY PROBLEM
Algorithm for the solution of the Faddeev equation for a system of three identical spinless particles, 17:32034 (R;SU;In Russian)
THROMBOCYTES
See BLOOD PLATELETS
THROMBOSIS
Quantitation of comparative thrombogenicity of dog, pig and human platelets (PLT) in a hemodialyzer (HD), 17:31840 (RA;US)
Quantitation of thrombogenicity of technetium-99M and indium-111 labeled canine platelets (PLT) in a hemodialyzer (HD), 17:31839 (RA;US)
THULIUM 170
Mutagenic effects induced by accumulating rare earths nuclides with different ionic radius in fission fragments, 17:31877 (R;CN;In Chinese)
THULIUM IONS
Optical properties of Er^{3+} and Tm^{3+} doped Y_2SiO_5, 17:31250 (R;FR)
THYRISTORS
Upgrading of the stabilized direct-current power supply unit for the main winding of the iron-current channel at the JINR phasotron, 17:31492 (R;SU;In Russian)
THYROID
Point-pair distributions for internal dosimetry, 17:31897 (RA;US)
Radiation absorbed dose to the human fetal thyroid, 17:31886 (RA;US)
X-ray and radioiodine dose to thyroid follicular cells, 17:31908 (RA;US)
TID
See TRAVELLING IONOSPHERIC DISTURBANCE
TIGHT SANDS
See SANDSTONES
TIME-OF-FLIGHT METHOD
Interest of TOF PET for clinical applications, 17:31771 (R;FR)
TIMING CIRCUITS
A distributed timing system for sychronizing control and data correlation, 17:31508 (R;US)
TIN ISOTOPES
A pocketful of tin isomers from heavy-ion collisions, 17:32272 (R;US)
Gamma spectroscopy of multiple nucleon transfer reactions in Sn, 17:32240 (R;US)
TIN OXIDES
Thermal pretreatment effect on polycrystalline tin dioxide electrical properties. Application to methane detection, 17:31615 (R;FR;In French)
TISSUES
The United States uranium registry tissue program: An update, 17:31932 (IA;CA)
TITANIUM
Radioactivities induced in some LDEF samples (Long Duration Exposure Facility (LDEF)), 17:32251 (R;US)
TITANIUM BORIDES
Combustion synthesis method and products, 17:31261 (PA;US)
TITANIUM CARBIDES
Fabrication of high temperature materials by exothermic synthesis and subsequent dynamic consolidation, 17:31276 (PA;US)
TITANIUM COMPOUNDS
See also TITANIUM BORIDES
TITANIUM CARBIDES
Desulfurization of hot fuel gas produced from high-chlorine Illinois coals: Technical report, December 1, 1991–February 29, 1992, 17:30459 (R;US)
TLD (DOSEMETERS)
See THERMOLUMINESCENT DOSEMETERS
TLD (DOSIMETRY)
See THERMOLUMINESCENT DOSIMETRY
TLD SYSTEMS
See THERMOLUMINESCENT DOSEMETERS
TOKAMAK DEVICES
See also DOUBLET-3 DEVICE
HT-6B TOKAMAK
ITER TOKAMAK
TEXTOR TOKAMAK
TFTR TOKAMAK
TORE SUPRA TOKAMAK
Excitation adjustable system of toroidal field waveform for tokamak HL-1, 17:32397 (R;CN;In Chinese)
Investigation of component failure rates for pulsed versus steady state tokamak operation, 17:32455 (R;US)
Nonlinear studies of m = 1 modes in high-temperature plasmas, 17:32419 (R;US)
The anomalous transport caused by magnetic perturbation in tokamak, 17:32446 (R;CN)
The suppression of multiple tearing modes using helical field, 17:32395 (R;CN;In Chinese)
Theoretical basis for advanced plasma configurations, 17:32403 (R;US)
Tokamak equilibria and transport based on Grad's thirteen moment description, 17:32414 (R;US)
TOKAMAK FUSION TEST REACTOR
See TFTR TOKAMAK
TOLUENE
Novel technique for coal pyrolysis and hydrogenation product analysis: Quarterly report, January 1991–March 1991, 17:30437 (R;US)
TOMATOES
[Mechanisms of inhibition of viral replication in plants]: Progress report, 17:30797 (R;US)
TOMOGRAPHY
See also COMPUTERIZED TOMOGRAPHY
Reflexion tomography: what information is comprised in the incoming times, 17:30563 (R;FR;In French)
TONOPAH TEST RANGE
Lightning threat warning system at the Tonopah Test Range, 17:31639 (R;US)
TOOLS (EDUCATIONAL)
See EDUCATIONAL TOOLS
TOP PARTICLES
Report of the subgroup on the top quark, 17:32152 (R;US)
Superstring derived standard-like models and the top quark mass hierarchy, 17:32128 (R;US)
TORE SUPRA
See TORE SUPRA TOKAMAK
TORE SUPRA TOKAMAK
Lower hybrid current drive experiments in Tore Supra, 17:32422 (R;FR)
Lower hybrid wave coupling in Tore Supra through multi junction launchers, 17:32423 (R;FR)
TOTAL-ABSORPTION SPECTROMETERS
See SHOWER COUNTERS
TOUGHNESS (FRACTURE)
See FRACTURE PROPERTIES
TOWERS (EXTRACTION)
See EXTRACTION COLUMNS
TOXIC MATERIALS
Innovative technologies for removing toxic compounds from groundwater and air, 17:31662 (R;US)
Ross Hazardous and Toxic Materials Handling Facility: Environmental assessment, 17:31694 (R;US)
TRACK DETECTORS (DIELECTRIC)
See DIELECTRIC TRACK DETECTORS
TRACK DETECTORS (GAS)
See GAS TRACK DETECTORS
TRACKS
See PARTICLE TRACKS

TRADE (NUCLEAR)
See NUCLEAR TRADE
TRAJECTORIES
A numerical method for the ray-tracing of polarized beams, 17:31451 (R;FR)
TRANQUILIZERS
Interaction of triazolam with central type benzodiazepine receptors studied in living baboons using positron emission tomography, 17:31798 (RA;US)
Intrinsic efficacies of benzodiazepine receptor ligands evaluated in vivo by positron emission tomography in the primate brain, 17:31799 (RA;US)
TRANQUILLIZERS
See TRANQUILIZERS
TRANS 104 ELEMENTS
Concentration of light homologs of superheavy elements in coal combustion, 17:31724 (R;SU;In Russian)
TRANSDUCERS
Direct current transducer, 17:31618 (R;SU;In Russian)
TRANSFER (ELECTRON)
See ELECTRON TRANSFER
TRANSFER (ENERGY)
See ENERGY TRANSFER
TRANSFER (HEAT)
See HEAT TRANSFER
TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION
TRANSFER REACTIONS
Gamma spectroscopy of multiple nucleon transfer reactions in Sn, 17:32240 (R;US)
TRANSITION ELEMENT COMPOUNDS
See also IRON COMPOUNDS
NIOBIUM COMPOUNDS
TITANIUM COMPOUNDS
Binding and catalytic reduction of NO by transition metal aluminosilicates: Technical progress report, March 1992–May 1992, 17:30483 (R;US)
TRANSITION ELEMENTS
See also COBALT
COPPER
GOLD
MOLYBDENUM
NICKEL
TITANIUM
YTTRIUM
ZIRCONIUM
Studies of the III-V compounds in the megabar regime: Technical progress report, 17:31222 (R;US)
TRANSITION METALS
See TRANSITION ELEMENTS
TRANSITIONS (ENERGY LEVEL)
See ENERGY-LEVEL TRANSITIONS
TRANSMISSION (HEAT)
See HEAT TRANSFER
TRANSMISSION LINES
See POWER TRANSMISSION LINES
TRANSMUTATION
Calculation of the transmutation rates of Tc-99, I-129 and Cs-135 in the High Flux Reactor, in the Phenix Reactor and in a light water reactor, 17:30685 (R;NL)
TRANSPORT
See also WASTE TRANSPORTATION
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)
TRANSPORT (CHARGED-PARTICLE)
See CHARGED-PARTICLE TRANSPORT
TRANSPORT (GAMMA)
See PHOTON TRANSPORT
TRANSPORT (NEUTRON)
See NEUTRON TRANSPORT
TRANSPORT (PHOTON)
See PHOTON TRANSPORT
TRANSPORT (RADIATION)
See RADIATION TRANSPORT
TRANSPORT THEORY
See also NEUTRON TRANSPORT THEORY
Numerical analysis of gas puff modulation experiment on JT-60U, 17:32428 (R;JP)
TRANSPORTATION SECTOR
Transportation Assessment and Integration (TRAIN): A basis for planning DOE transportation in the 1990s: Final report, 17:31065 (R;US)
TRANSURANIUM ELEMENTS
See also NEPTUNIUM
PLUTONIUM
Approximating the r-process on earth with thermonuclear explosions, 17:31637 (R;US)
Molten salt/metal extractions for recovery of transuranic elements, 17:30654 (R;US)
TRANSURANIUM WASTES
See ALPHA-BEARING WASTES
TRAVELLING IONOSPHERIC DISTURBANCE
Geostationary-satellite beacon-receiver array for studies of ionospheric irregularities, 17:32052 (R;US)
TREES
See also WILLOWS
A computer simulation of ecosystem processes in forests for application to air pollution, acid precipitation and global change, 17:31674 (R;US)
TRI-UNIVERSITY MESON FACILITY
See TRIUMF CYCLOTRON
TRICHLOROMETHANE
See CHLOROFORM
TRIGGER CIRCUITS
Fully pipelined and programmable Level 1 trigger, 17:31527 (R;US)
Triggering system for relativistic hypernuclei detection, 17:31575 (R;SU;In Russian)
TRIIODOTHYRONINE
Preparation of rT_3 in human serum ria kit, 17:31329 (R;CN;In Chinese)
TRIPLET PARTICLES
See QUARKS
TRISTAN PROJECT
See TRISTAN STORAGE RINGS
TRISTAN STORAGE RINGS
A use of EGS4 in the TOPAZ detector simulator, 17:31500 (RA;JP;In Japanese)
TRITIUM
Preliminary interpretation of the Libretto-2 experimental results in terms of tritium permeation barrier efficiency, 17:30657 (R;FR)
Verification and validation of TMAP4, 17:32456 (R;US)
TRITIUM EXTRACTION PLANTS
User's manual for the ARMLID (Argonne metallic lithium/isotopic dilution) tritium assay system, 17:32437 (R;US)
TRITIUM RECOVERY
Fabrication, properties and tritium release rates of lithium zirconates: Paper presented at the 'Third International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93rd Annual Meeting of the American Ceramic Society', Cincinnati, Ohio, April 28-May 2, 1991, 17:32452 (R;NL)
TRITON REACTIONS
Charge-exchange cross sections of the $^3H \rightarrow ^3He$ reaction on hydrogen, carbon, aluminium, copper and lead at 9 GeV/c, 17:32332 (R;SU;In Russian)
TRIUMF CYCLOTRON
Beam instrumentation for an H^- cyclotron meson factory, 17:31494 (RA;JP)
TROUT
Rock Island Dam smolt monitoring, 1991, 17:30819 (R;US)
TRU WASTES
See ALPHA-BEARING WASTES
TRX-1
See REVERSE-FIELD PINCH
TUBES
A new corrosion testing facility with heat flux caused surface boiling conditions, 17:31212 (R;CN;In Chinese)

Analysis of cracks and fractography on steam generator tubes, 17:30890 (R;CN;In Chinese)
Natural convection between a vertical cylinder and a surrounding array, 17:31388 (R;US)
Turbulent natural convection between a perforated vertical cylinder and a surrounding array, 17:31389 (R;US)
Wastage-resistant FBC evaporator tubing through microalloying, 17:31223 (R;US)

TUBES (CONDUITS)
See PIPES

TUFF
TSPA 1991: An initial total-system performance assessment for Yucca Mountain: Yucca Mountain Site Characterization Project, 17:30719 (R;US)

TUMOR CELLS
^{11}C-thymidine: An in-vivo tracer for cell proliferation, 17:31819 (RA;US)
Application of PET and compartmental modeling in estimation of cellular level microdosimetry: PET studies of I-124 labeled 3F8 MAb in human glioma, 17:31902 (RA;US)
Modification of primary radiation injuries of biological systems by into compounds, 17:31978 (RA;SU;In Russian)
Radiosensitivity of L5178Y mice lymphoma cells and state of antioxidant enzyme system, 17:31971 (RA;SU;In Russian)

TUMORS
See NEOPLASMS

TUNNEL EFFECT
Quantum tunneling in the periodically driven SU(2) model, 17:32020 (R;FR)

TUNNELS
Repository tunnel construction in deep clay formations, 17:30697 (R;FR)

TURBINE BLADES
Effects of cooling-air injection on secondary flows and losses in a turbine cascade, 17:31400 (R;JP)

TURBULENT FLOW
An experimental investigation on turbulent flow through symmetric wall-subchannels of rod bundles, 17:31378 (R;CN;In Chinese)
Comparison of two stochastic models of scalar diffusion in turbulent flow, 17:31677 (R;US)
Development and verification of an anisotropic turbulence model in the COMMIX-1C/ATM computer code, 17:32363 (R;US)
Numerical fluid flow and heat transfer calculations on multiprocessor systems, 17:31371 (R;FI)
Optical monitor for observing turbulent flow, 17:31612 (PA;US)
Performance of a plasma fluid code on the Intel parallel computers, 17:32405 (R;US)

TURKEY
Characterization of selected countries, 17:30555 (RA;US)

TWO-BODY PROBLEM
A numerical solution of the two-center problem, 17:32038 (R;SU;In Russian)

TWO-PHASE FLOW
A comparison of numerical procedures for calculation of steady two- and three-dimensional two-phase flow, 17:31373 (R;FI)
Experiences with numerical fluid flow and heat transfer calculations on multiprocessor computers: Lecture given at the Symposium on Chemical Engineering of the Finnish Chemical Congress in Helsinki, on November 9, 1989, 17:31374 (R;FI)
LDEF-SS: Two-phase fluid flow in spray dryers, 17:32538 (CM;US)
LDEF-SS: Two-phase fluid flow in spray dryers, 17:32539 (CM;US)
Optical imaging systems for two phase flow, 17:30524 (RA;US)
Parallel computation of steady three-dimensional two-phase flows, 17:31375 (R;FI)
Particle-fluid two-phase flow modeling, 17:31390 (R;US)
The compactness of front tracking for chromatography electrophoresis and incompressible multiphase flow, 17:32365 (R;US)
The three-dimensional transient two-phase flow computer programme BACCHUS-3D/TP, 17:31395 (R;DE)
Two-phase flow characteristics analysis code: MINCS, 17:31394 (R;JP)
Two-phase flow modeling with discrete particles, 17:31129 (R;US)
Using probability density distribution analysis of bubble diameter and spatial frequency analysis to identify flow pattern of two-phase flow in an unvisual pipe, 17:31377 (R;CN;In Chinese)

TYPE-II SUPERCONDUCTORS
Intermetallic superconductors - The state of development in 1991, 17:32382 (RA;US)

TYPE-III SUPERCONDUCTORS
See TYPE-II SUPERCONDUCTORS

U

U CODES
Independent verification and benchmark testing of the UNSAT-H computer code, Version 2.0, 17:31697 (R;US)

UAR
See EGYPTIAN ARAB REPUBLIC

UCLLL
See LAWRENCE LIVERMORE LABORATORY

UHF RADIATION (01-100 GHZ)
See RADIOWAVE RADIATION

UHF RADIATION (100-1000 MHZ)
See RADIOWAVE RADIATION

UHF RADIATION (LOWER RANGE)
See RADIOWAVE RADIATION

UHF RADIATION (UPPER RANGE)
See RADIOWAVE RADIATION

ULTRAHIGH FREQUENCY RADIATION (01-100 GHZ)
See RADIOWAVE RADIATION

ULTRAHIGH FREQUENCY RADIATION (100-1000 MHZ)
See RADIOWAVE RADIATION

ULTRAHIGH FREQUENCY RADIATION (LOWER RANGE)
See RADIOWAVE RADIATION

ULTRAHIGH FREQUENCY RADIATION (UPPER RANGE)
See RADIOWAVE RADIATION

ULTRASONIC TESTING
4th international school of nondestructive testing, 17:31403 (I;CS;In Czech, Slovak)

UNDERGROUND DISPOSAL
Approach to geologic repository post closure system performance assessment, 17:30722 (R;US)
Comments on the state of knowledge about climatic and geological processes and extra-terrestrial events, 17:31685 (RA;CA)
Deformation stresses and mechanical behaviour of engineered barriers in the repository environment, 17:30750 (R;FI;In Finnish)
Ground water chemistry and water-rock interaction at Olkiluoto, 17:30752 (R;FI)
Progress report of the 600 m borehole project of the CEC programme on management and storage of radioactive waste: January-June 1991, 17:30679 (R;NL)
Scenarios for groundwater flow and radionuclide migration of concern for the TVO-92 safety analysis, 17:30749 (R;FI)

UNDERGROUND FACILITIES
See also MINES
TUNNELS
WIPP
Sealing performance of bentonite and bentonite/crushed rock borehole plugs, 17:30710 (R;US)
WIPP supplementary roof support system, Room 1, Panel 1: Geotechnical field data analysis bi-annual report, 17:30678 (R;US)

UNDERGROUND STORAGE
Regulated underground storage tanks, 17:30661 (R;US)

UNDERWATER FACILITIES
The interaction between water waves and marine structures, 17:31409 (I;NO)

UNION OF SOVIET SOCIALIST REPUBLICS
See USSR

UNITED ARAB REPUBLIC
See EGYPTIAN ARAB REPUBLIC

UNITED KINGDOM
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

UNIVERSE
A theoretical kinematical study of the gradient of any cosmic scalar field, 17:32074 (R;XA)

URANINITES
Gold occurrence in radioactive calc-silicate float at Sandybeach Lake, Nueltin Lake area, District of Keewatin, 17:30607 (RA;CA)

URANIUM
See also DEPLETED URANIUM
NATURAL URANIUM
200 Areas operation monthly report, October 1968, 17:30637 (R;US)
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)
Evaluation of actinide volatilities in mixed waste processors, 17:30735 (R;US)
Nondestructive assays of 55-gallon drums containing uranium and transuranic waste using passive-active shufflers, 17:30709 (R;US)
Quantitative analysis of plutonium and uranium using reversed-phase liquid chromatography and spectrophotometric detection, 17:31305 (R;US)
Study of the extraction and the purification of americium and trivalent actinides contained in effluents with supported liquid membranes, 17:31333 (R;FR;In French)
Supercritical CO_2 cleaning for waste minimization, 17:31638 (R;US)
The in-plant evaluation of a uranium NDA system, 17:30768 (R;US)

URANIUM 238 TARGET
Contributions of Gerard deSaussure to fission physics: Subthreshold and near-subthreshold measurements at the ORELA, 17:32277 (R;US)

URANIUM ALLOYS
Molten aluminum alloy fuel fragmentation experiments, 17:30997 (R;US)

URANIUM DEPOSITS
Developments in uranium geology in Canada, 1985, 17:30606 (RA;CA)
Radon and radon daughter concentrations over an extended uranium ore body, 17:30614 (IA;CA)

URANIUM DIOXIDE
Leaching process of nuclear fuel in leaching solution at sub-boiling temperature, 17:30638 (R;CN;In Chinese)
Low temperature sintering of hyperstoichiometric uranium dioxide, 17:30633 (R;FR;In French)
Preparation of uranium dioxide powder: Process for production coarse particle ADU precipitate in pilot plant, 17:30634 (R;CN;In Chinese)
Source term models for the release of radionuclides from used nuclear fuel, 17:30726 (RA;SE)

URANIUM HEXAFLUORIDE
Gas-phase chemical reactivity of CFC-114 and potential replacements: Part 4, Reactivity of c-C_4F_8 with F_2 and UF_6, 17:31317 (R;US)

URANIUM ISOTOPES
The α-decay properties of light uranium isotopes, 17:32244 (R;US)

URANIUM MINES
See also CLUFF LAKE MINE
A dynamic approach to the implementation of the optimization principle in uranium mines, 17:30611 (IA;CA)
A study of the dose conversion factors for inhalation risk assessment from radon daughters in mine atmospheres, 17:30618 (IA;CA)
Abstracts of the International Conference on Occupational Radiation Safety in Mining, 17:30608 (I;CA)
Characterization of radioactive long-lived dust present in uranium mines and mills atmospheres, 17:30624 (IA;CA)
Derived surface contamination limits for the uranium mining and milling industry, 17:30627 (IA;CA)
Development of a joint labour-management safety inspection system at Denison operations, 17:30632 (IA;CA)
Evaluation of a microcomputer system for controlling and monitoring radiation hazards in uranium mines, 17:30631 (IA;CA)
In-mine evaluation of continuous radon and working level detectors, 17:31555 (IA;CA)
Measurement of temporal variations in radon progeny working levels in mine atmospheres, 17:30617 (IA;CA)
Pilot ALARA analysis applied to dose reduction in an underground uranium mine, 17:30609 (IA;CA)
Project: Radiological assessment of the southern region of East Germany. Natural radioactivity. Long-standing land pollution from mining activities. Radon activity. Management of long-standing land pollution. Database establishment. Radiological assessment. Participation and information of the public, 17:31658 (I;DE;In German)
Radon emanation at the Muellenbach research uranium mine and its effects on ventilation planning, 17:30625 (IA;CA)
Recreating and measuring the underground environment of the late 1950's, 17:31717 (IA;CA)
The development, introduction and early operating experience of a large scale external gamma monitoring program in Canadian uranium mines, 17:30616 (IA;CA)

URANIUM OXIDES
See also URANIUM DIOXIDE
URANIUM TRIOXIDE
A new apparatus for continuous countercurrent flow of solids and liquids, 17:31124 (R;US)

URANIUM TRIOXIDE
In vitro and in vivo bioassay applied to uranium trioxide, 17:31989 (RA;US)

URANYL FLUORIDES
Study on the retention of enriched UO_2F_2 in the mouse and its radiogenotoxicological effects, 17:31876 (R;CN;In Chinese)

URANYL NITRATES
Development of time-resolved laser fluorescence spectrometry for on-line uranium checking in solutions of the Purex reprocessing process, 17:30640 (R;FR;In French)

URBAN AREAS
Urban ecological initiatives, 17:31056 (I;DK;In Danish)

URINALYSIS
See URINE

URINE
Uranium measurements in urine: A summary of the operating experience at Canadian uranium mills, 17:31945 (IA;CA)

US CLEAN COAL TECHNOLOGY PROGRAM
Characterization of selected countries, 17:30555 (RA;US)
Comparative analyses of potential markets, 17:30556 (RA;US)
Comprehensive report to Congress: Proposals received in response to the Clean Coal Technology IV Program Opportunity Notice, 17:30420 (R;US)
Identification of likely market niches, 17:30558 (RA;US)
Implications for the US Department of Energy's Clean Coal Technology Demonstration Program, 17:30559 (RA;US)
Status of the US Department of Energy's Clean Coal Technology Demonstration Program, 17:31071 (RA;US)
Trade-related issues and barriers, 17:30557 (RA;US)
Trends in international research, development, and demonstration of clean coal technologies, 17:30554 (RA;US)

US DOD
Integrated risk management for business survival, 17:32497 (R;US)

US DOE
See also ALASKA POWER ADMINISTRATION
FEED MATERIALS PRODUCTION CENTER
HAPO
HANFORD ENGINEERING DEVELOPMENT LABORATORY
HANFORD RESERVATION
IDAHO CHEMICAL PROCESSING PLANT
IDAHO NATIONAL ENGINEERING LABORATORY
LAWRENCE LIVERMORE LABORATORY

NEVADA TEST SITE
ORNL
PANTEX PLANT
ROCKY FLATS PLANT
SANDIA LABORATORIES
SAVANNAH RIVER PLANT
US NIPER
WIPP
WESTERN AREA POWER ADMINISTRATION
Y-12 PLANT
1992 DOE Defense Critical Technologies Plan, 17:31193 (R;US)
Advanced energy projects FY 1992 research summaries, 17:32480 (R;US)
Applied research and development private sector accomplishments: FY90 contracts, 17:31061 (R;US)
Characteristics of potential repository wastes: Volume 2, 17:30975 (R;US)
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)
Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act Section 120(e)(5): Annual report to Congress for Fiscal Year 1991, 17:30758 (R;US)
DOE Personal Property Management Factbook, Fiscal Year 1991, 17:32489 (R;US)
Hydrogen Program Plan, FY 1993–FY 1997, 17:30793 (R;US)
National laboratories and CRADAs: Summary, 17:31060 (R;US)

US DOE PROGRAM MANAGEMENT
Line Program Environmental Management Audit: Formerly Utilized Sites Remedial Action Program, 17:32488 (R;US)

US EPA
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)

US NAVAL PETROLEUM RESERVES
Endangered Species Program Naval Petroleum Reserves in California: Annual report FY90, 17:30579 (R;US)

US NIPER
[National Institute for Petroleum and Energy Research] monthly progress report for June 1992, 17:30574 (R;US)

US NRC
Comparative analysis of DOE Order 5820.2A, NRC, and EPA radioactive and mixed waste management requirements, 17:30665 (R;US)
Nuclear Regulatory Commission issuances, June 1992: Volume 35, No. 6, 17:30920 (R;US)

USSR
Anticipated radiation environmental effect from the Moscow Kaon Factory, 17:30966 (RA;US)
Radioactive waste management in the USSR: A review of unclassified sources: Volume 2, 17:30711 (R;US)

UTAH
Key wintertime meteorological features of the Grand Canyon and the Colorado Plateaus Basin, 17:31668 (R;US)

UTERINE CERVIX CARCINOMA
See CARCINOMAS

UTR-10 IOWA STATE UNIVERSITY REACTOR
See IOWA UTR-10 REACTOR

V

V CODES
VARSKIN: Dose calculation of contamination of the skin, 17:32543 (CM;US)
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

VALENCE ELECTRONS
See ELECTRONS

VALIDATION
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)

VALVES
Aging and service wear of solenoid-operated valves used in safety systems of nuclear power plants: Volume 2, Evaluation of monitoring methods, 17:30947 (R;US)
Piping system response during high-level simulated seismic tests at the Heissdampfreaktor Facility: (SHAM Test Facility), 17:30993 (R;US)
Recommendations on frequently encountered relief requests, 17:30942 (R;US)

VANADIUM 50 TARGET
Measurement of the cross section of the $^{36}Ar(n,\alpha)^{33}S$ and $^{50}V(n,p)^{50}Ti$ reactions induced by thermal neutrons, 17:32333 (R;SU;In Russian)

VANADIUM MINERALS
See MINERALS

VANADIUM OXIDES
Kinetics and dynamics of oxidation reactions involving an adsorbed CO species: Second year annual report, January 1, 1992–December 31, 1992, 17:31315 (R;US)

VAPOR-DOMINATED SYSTEMS
Stanford Geothermal Program [quarterly technical progress reports, July–September 1990 and October–December 1990], 17:30846 (R;US)

VAPORS
Operating characteristics of rotating beds: Technical progress report for the third quarter 1988, 17:31297 (R;US)

VECTOR FIELDS
Normal equivariant forms of vector fields, 17:32086 (R;XA;In French)

VEGETABLES
Development of radiation preservation technique in Beijing, 17:31856 (R;CN)

VEGETATION
See PLANTS

VEHICLES
See also AUTOMOBILES
BUSES
ELECTRIC-POWERED VEHICLES
SPACE VEHICLES
Intra-site secure transport vehicle, 17:30774 (R;US)
Meeting future exhaust emissions standards using natural gas as a vehicle fuel: Lessons learned from the natural gas vehicle challenge '92, 17:31189 (R;US)
RATLER: Robotic All-Terrain Lunar Exploration Rover, 17:31365 (R;US)

VELOCITY
Optimization of a VISAR for measuring flyer-plate velocities, 17:31634 (R;US)

VENTILATION
Computer modeling of airborne alpha radiation in mines, 17:31655 (IA;CA)
Demand controlled ventilating systems: Sensor market survey, 17:31091 (R;SE)

VENTILATION DUCTS
See VENTILATION

VENTILATION SYSTEMS
A miniature modular multichannel analyzer system for automated, low- resolution gamma-ray spectroscopy, 17:30760 (R;US)

VERTICAL AXIS TURBINES
Measured data for the Sandia 34-meter vertical axis wind turbine, 17:30862 (R;US)

VERY HIGH FREQUENCY RADIATION
See RADIOWAVE RADIATION

VESSELS
See CONTAINERS

VESSELS (CHEMICAL REACTIONS)
See CHEMICAL REACTORS

VESSELS (PRESSURE)
See PRESSURE VESSELS

VESSELS (REACTOR)
See REACTOR VESSELS

VHF RADIATION
See RADIOWAVE RADIATION

VIBRATIONAL BAND
See VIBRATIONAL STATES
VIBRATIONAL STATES
A neural network approach for the investigation of chemical phenomena, 17:31312 (R;US)
VIRAL DISEASES
See also AIDS
Detection of cells infected by Thailand strains of pseudorabies virus using a specific DNA probe, 17:31861 (RA;XA)
Regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques: Proceedings of a final research co-ordination meeting of an FAO/IAEA/SIDA co-ordinated research programme held in Heredia, Costa Rica, 22-26 October 1990, 17:31860 (R;XA)
The use of ELISA and nucleic acid hybridization tests in research and diagnosis of bovine leukosis virus, 17:31862 (RA;XA)
VIRUSES
Detection of cells infected by Thailand strains of pseudorabies virus using a specific DNA probe, 17:31861 (RA;XA)
VISCOSITY
Coal plasticity at high heating rates and temperatures: Second technical progress report for the third quarter 1990, 17:30440 (R;US)
VISION
Functional MRI studies of human vision on a clinical imager, 17:31849 (R;US)
VOC
See ORGANIC COMPOUNDS
VOLATILE MATTER
VOIDS
Ductile fracture process of discontinuous fiber reinforced composites, 17:31272 (R;US)
VOLATILE MATTER
Analysis of IMS spectra using neural networks, 17:31318 (R;US)
Motor vehicle fuel economy, the forgotten HC control stragegy?, 17:31187 (R;US)
VOLCANIC ROCKS
Study on collection of resource evaluation bases in the northern Tohoku district (Akita-Koma).: Geological survey of Tashiro-dake and Tara-Komagadake areas, 17:30835 (IA;JP;In Japanese)
VOLTAIC CELLS
See ELECTRIC BATTERIES
VORTICES
Vortices in nonuniform upper-hybrid field, 17:32406 (R;SE)
Vortices with a nonuniform group velocity, 17:32407 (R;SE)
VRAIN REACTOR
Characteristics of potential repository wastes: Volume 4, Appendix 4A, Nuclear reactors at educational institutions of the United States; Appendix 4B, Data sheets for nuclear reactors at educational institutions; Appendix 4C, Supplemental data for Fort St. Vrain spent fuel; Appendix 4D, Supplemental data for Peach Bottom 1 spent fuel; Appendix 4E, S, 17:30902 (R;US)

W

WALKER CARCINOMA
See EXPERIMENTAL NEOPLASMS
WALLS
Program overview of the hollow clay tile wall program, 17:31368 (R;US)
Structural testing of clay tile walls testing and evaluation program, 17:31284 (R;US)
White paper on the Hollow Clay Tile Wall Program, 17:31370 (R;US)
WAPA
See WESTERN AREA POWER ADMINISTRATION
WARD IDENTITY
A Polyakov action on Riemann surfaces, 17:32118 (R;FR)
WASTE BURIAL
See UNDERGROUND DISPOSAL
WASTE CHEMICALS
See CHEMICAL WASTES
WASTE DISPOSAL
See also RADIOACTIVE WASTE DISPOSAL
SANITARY LANDFILLS
UNDERGROUND DISPOSAL
Radionuclides, inorganic constituents, organic compounds, and bacteria in water from selected wells and springs from the southern boundary of the Idaho National Engineering Laboratory to the Hagerman Area, Idaho, 1990, 17:31752 (R;US)
The mass transfers of water by diffusion and permeation through a covering of wastes disposal, 17:30655 (R;FR)
WASTE FORMS
Acoustic monitoring techniques for corrosion degradation in cemented waste canisters, 17:30691 (R;FR)
Phase stability determinations of DWPF waste glasses, 17:30743 (R;US)
VERTPAK1: Code verification analytic solution, 17:32528 (CM;US)
WASTE ISOLATION PILOT PLANT
See WIPP
WASTE MANAGEMENT
See also RADIOACTIVE WASTE MANAGEMENT
WASTE DISPOSAL
WASTE PROCESSING
WASTE STORAGE
WASTE TRANSPORTATION
Applied research and development private sector accomplishments: FY90 contracts, 17:31061 (R;US)
Miscellaneous Waste Stream strategy document, 17:30703 (R;US)
Radar operations process waste assessment: Solder pot tinning, 17:31132 (R;US)
WASTE PROCESSING
See also RADIOACTIVE WASTE PROCESSING
Electrochemical oxidation of organic materials, 17:31141 (PA;US)
WASTE SOLUTIONS
See LIQUID WASTES
WASTE STORAGE
See also RADIOACTIVE WASTE STORAGE
Ovality of the steel lining in the HAW test field, 17:30683 (R;NL)
WASTE TRANSPORTATION
Transportation Systems Center, 17:30647 (R;US)
WASTE TREATMENT
See WASTE PROCESSING
WASTE WATER
The suitability and operational cost of the electrolytic phenol wate water purification, 17:31140 (R;FI;In Finnish)
Waste minimization in the oil and gas industries, 17:30578 (R;US)
WASTE-FUELED BOILERS
See REFUSE-FUELED BOILERS
WASTEFORMS
See WASTE FORMS
WASTES
See also CHEMICAL WASTES
GASEOUS WASTES
LIQUID WASTES
ORGANIC WASTES
RADIOACTIVE WASTES
SOLID WASTES
Miscellaneous Waste Stream strategy document, 17:30703 (R;US)
WATER
See also DRINKING WATER
FEEDWATER
GROUND WATER
HEAVY WATER
RAIN WATER
WASTE WATER
A new model of coal-water interaction and relevance for dewatering: Quarterly technical progress report, December 1, 1991–February 28, 1992, 17:30425 (R;US)
Boiling crisis in water forced flow in tubes, 17:31391 (R;SU;In Russian)
Boundary void fraction in water flow in tubes, 17:31393 (R;SU;In Russian)

Determination of plutonium in environmental water, 17:31292 (R;CN;In Chinese)
Measure of water transfers by diffusion and permeation through materials, 17:30656 (R;FR)
Modelling of freon heat transfer in water under supercritical pressure, 17:31392 (R;SU;In Russian)
Oxidation-sulfidation behavior of iron alloys containing 16 to 40 atomic percent aluminum, 17:31216 (R;US)
Swelling pressure, water uptake, and permeability of 70/30 crushed salt/bentonite, 17:30721 (R;US)
The mass transfers of water by diffusion and permeation through a covering of wastes disposal, 17:30655 (R;FR)

WATER COOLANT
See WATER

WATER COOLED REACTORS
See also ACPR REACTOR
BWR TYPE REACTORS
HFETR REACTOR
HFR REACTOR
IOWA UTR-10 REACTOR
NSRR REACTOR
PWR TYPE REACTORS
POOL TYPE REACTORS
Characteristics of potential repository wastes: Volume 1, 17:30869 (R;US)
Characterization of jet breakup mechanisms observed from simulant experiments of molten fuel penetrating coolant: Technical progress report, FY 1992, 17:31005 (R;US)
Iodine chemical form in LWR reactor accidents: Regulatory perspectives in the United States, 17:30919 (RA;JP)

WATER HEATERS
Efficient domestic hot water heating, 17:31105 (R;DK;In Danish)

WATER MODERATOR
See WATER

WATER POLLUTION
Measurements, classification and valorization of environmental problems: Case rural area of Oulu, 17:31667 (R;FI;In Finnish)

WATER PUMPS
Asymmetric flow events in a VEER 1000, 17:30998 (R;US)

WATER QUALITY
Technical summary of groundwater quality protection program at the Savannah River Site (1952–1986): Volume 2, Groundwater monitoring results, 17:31696 (R;US)

WATER SOLUTIONS
See AQUEOUS SOLUTIONS

WATER TREATMENT PLANTS
An evaluation of Hanford water treatment practices addendum, 17:30969 (R;US)
Energy problems in the opration of water treatment plants in cold periods: Phase 1 (1988-1990), 17:31149 (R;DK;In Danish)

WATER WAVES
The interaction between water waves and marine structures, 17:31409 (I;NO)

WATERBORNE PARTICLES
See PARTICULATES

WATERSHEDS
See also PICEANCE CREEK BASIN
Ecological effects of contaminants and remedial actions in Bear Creek, 17:31726 (R;US)

WAVE PROPAGATION
Propagation of relativistic high current electron beams across the geomagnetic field, 17:31463 (R;US)

WAVES (SHOCK)
See SHOCK WAVES

WAZ 16
See NICKEL BASE ALLOYS

WECS
See WIND TURBINES

WEINBERG ANGLE
Exotic fermion mixing revisited, 17:32149 (R;FR)

WEINBERG LEPTON MODEL
Spontaneous decoupling of extended Gauge models, 17:32148 (R;FR)

WEINBERG MODEL
See WEINBERG LEPTON MODEL

WELDED JOINTS
Characterizing laser fusion welded aluminum using synchrotron x-ray microtomography, 17:31406 (R;US)
Improving the properties of stainless steel electron-beam welds by laser treatment, 17:31213 (R;CN;In Chinese)
Thermal stress and strain analysis in traveling autogenous welds, 17:31363 (R;US)

WELDING
See also ARC WELDING
LASER WELDING
SOLDERING
Comparison of European codes and standards on the welding of LMFBR components and proposals for their harmonization, 17:30913 (R;FR)
Thermal stress and strain analysis in traveling autogenous welds, 17:31363 (R;US)

WELDS
See WELDED JOINTS

WEST GERMANY
See FEDERAL REPUBLIC OF GERMANY

WEST VIRGINIA
Multi-strata exploration and production study, October 1,1989–September 24, 1992, 17:30588 (R;US)

WESTERN AREA POWER ADMINISTRATION
Western Area Power Administration: Combined power system financial statements and supplemental schedules (Combined Power System Financial Statements and Supplemental Schedules. September 30, 1991. (With Independent Auditor's Report Thereon)), 17:31047 (R;US)

WETLANDS
Effect of season, substrate composition, and plant growth on landfill leachate treatment in a constructed wetland, 17:31691 (R;US)

WEYL FIELD
See WEYL UNIFIED THEORY

WEYL UNIFIED THEORY
From the Weyl theory to a theory of locally anisotropic spacetime, 17:32099 (R;SU)

WILLOWS
Salix plantation: Machinery, methods and economy, 17:30798 (R;SE;In Swedish)

WIND
A smoke producing rocket motor for atmospheric wind profiling, 17:31627 (R;US)
Wind energy calculations for Swedish coastal water conditions. Report nr 3, 17:30855 (R;SE;In Swedish)

WIND ENERGY CONVERSION SYSTEMS
See WIND TURBINES

WIND GENERATORS
See WIND TURBINES

WIND POWER
IEA wind energy.: Annual report 1991, 17:30854 (R;SE)

WIND TURBINES
See also HORIZONTAL AXIS TURBINES
VERTICAL AXIS TURBINES
Linear quadratic control of variable speed wind turbines below rated power, 17:30859 (R;SE)
Matching asynchronous generators to small windmills, 17:30857 (I;DK)
Slow-running permanent magnetic generators for wind power etc. 1.5-100 kW: Calculations and draft, 17:30858 (I;DK;In Danish)

WINDOWS
Cesium iodide alloys, 17:31613 (PA;US)
Optimal design of windows: An investigation of heat technology, 17:31102 (R;DK;In Danish, English)

WIPP
WIPP supplementary roof support system, Room 1, Panel 1: Geotechnical field data analysis bi-annual report, 17:30678 (R;US)
Waste crate counter design, 17:30708 (R;US)

WOOD
Fatigue tests on glued laminated wood beams: Partial report 4: Testing of series C, 17:30856 (R;DK;In Danish)

WOOD ALCOHOL
See METHANOL

WOOD FUELS
System study, wood powder heat 30 kW - 3 MW, 17:30810 (R;SE;In Swedish)

WOOD WASTES
Part 1: Logging residues in piles - Needle loss and fuel quality. Part 2: Nitrogen leaching under piles of logging residues, 17:30806 (R;SE;In Swedish)
Techniques for separation of green parts, and nutrient content in green parts, 17:30814 (R;SE;In Swedish)

WORKERS
See PERSONNEL

WWER TYPE REACTORS
See also WWER-3 REACTOR
Asymmetric flow events in a VEER 1000, 17:30998 (R;US)

WWER-3 REACTOR
Reactor pressure vessel embrittlement: Report of the IAEA extrabudgetary programme on the safety of WWER-440 model 230 nuclear power plants, 17:30891 (R;XA)

WWER-440 REACTOR
See WWER-3 REACTOR

WYOMING
Unconventional gas systems analysis, 17:30590 (R;US)

X

X RADIATION
See also HARD X RADIATION
SOFT X RADIATION
Accidental exposure with X-ray diffraction equipment, 17:31992 (RA;US)

X-2830 RESONANCES
See MESONS

X-RASERS
See X-RAY LASERS

X-RAY DIFFRACTION
12th general conference of the condensed matter division of the E.P.S. V.16A., 17:32372 (I;CS)

X-RAY DIFFRACTOMETERS
Sample holder for x-ray diffractometry, 17:31600 (PA;US)

X-RAY FLUORESCENCE ANALYSIS
Application of the multi-element analysis by X-fluorescence and neutron activation to the characterization of an archaeological site, 17:31294 (R;FR;In French)

X-RAY LASERS
Demonstration of a neon-like rubidium x-ray laser, 17:31424 (R;US)
Experimental studies of x-ray laser spectral profiles: Observation of gain narrowing and saturation behavior, 17:31426 (R;US)
Experiments on resonantly photo-pumped x-ray lasers, 17:31423 (R;US)
Self-consistent one-dimensional modelling of x-ray laser plasmas, 17:31422 (R;US)
Table-top x-ray lasing based on optical-field-induced ionization, 17:31425 (R;US)

X-RAY SPECTRA
Calculations of LINAC spectrum characteristics using EGS4, 17:31503 (RA;JP;In Japanese)
Calculations of bremsstrahlung photon spectrum from β-ray radioisotopes, 17:31580 (RA;JP;In Japanese)

X-RAY SPECTROSCOPY
Theoretical standards in x-ray spectroscopies: Annual progress report, 1991–1992, 17:32355 (R;US)

XENON 118
Lifetime measurements in ^{118,120}Xe, 17:32245 (R;US)

XENON 120
Lifetime measurements in ^{118,120}Xe, 17:32245 (R;US)

XUV
See EXTREME ULTRAVIOLET RADIATION

Y

Y*RESONANCES
See BARYONS

Y-12 PLANT
Analysis of proposed postclosure alternatives for the Oil Landfarm Waste Management Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, 17:30746 (R;US)
Program overview of the hollow clay tile wall program, 17:31368 (R;US)
Structural testing of clay tile walls testing and evaluation program, 17:31284 (R;US)

YANG-MILLS THEORY
Linear supermultiplets and non-holomorphic gauge coupling functions, 17:32119 (R;FR)

YIELD (FISSION)
See FISSION YIELD

YOSHIDA SARCOMA
See EXPERIMENTAL NEOPLASMS

YTTERBIUM COMPLEXES
Synthesis, characterization and reactivity of some lanthanide organometallics, 17:31316 (R;FR;In French)

YTTRIUM
Optical properties of Er^{3+} and Tm^{3+} doped Y_2SiO_5, 17:31250 (R;FR)

YTTRIUM ALLOYS
Summary of the 12th study meeting of hydrogen energy system, 17:30794 (I;JP;In Japanese)

YTTRIUM ALUMINIUM GARNETS
See ALUMINIUM OXIDES

YTTRIUM OXIDES
Flux pinning in oxygen-depleted $YBa_2Cu_3O_{7-y}$ single crystals, 17:31264 (R;US)
High-temperature deformation and diffusion in oxides, 17:31245 (R;US)

YUCCA MOUNTAIN
Earthquake-induced water-level fluctuations at Yucca Mountain, Nevada, April 1992, 17:31747 (R;US)
Technical data base quarterly report, April–June 1992: Yucca Mountain Site Characterization Project, 17:30669 (R;US)
Yucca Mountain Site Characterization Project Technical Data Catalog: Yucca Mountain Site Characterization Project, 17:30668 (R;US)

Z

Z NEUTRAL BOSONS
Heavy flavour physics at LEP, 17:32170 (R;FR)
Phenomenology of one extra neutral Z, 17:32198 (R;FR)

ZEOLITES
Modeling strontium-cesium-calcium-magnesium-sodium ion exchange equilibria on chabazite with the Wilson equation, 17:30659 (R;US)
Structure sensitive reactions over Co, Fe and mixed metal clusters in zeolites: Annual technical progress report, 17:31314 (R;US)

ZINC COMPOUNDS
See also ZINC OXIDES
ZINC SELENIDES
ZINC SULFIDES
ZINC TELLURIDES
Desulfurization of hot fuel gas produced from high-chlorine Illinois coals: Technical report, December 1, 1991–February 29, 1992, 17:30459 (R;US)

ZINC OXIDES
Research on stable, high-efficiency, amorphous silicon multijunction modules: Annual subcontract report, 1 May 1991–30 April 1992, 17:30821 (R;US)

ZINC SELENIDES
Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)

ZINC SULFIDES
Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)
ZINC TELLURIDES
Annihilation characteristics in as-grown and electron irradiated Zn II-VI semiconductors, 17:32368 (R;FR)
ZION STATION UNIT-1
See ZION-1 REACTOR
ZION STATION UNIT-2
See ZION-2 REACTOR
ZION-1 REACTOR
Experiments to investigate the effects of 1:10 scale Zion structures on direct containment heating (DCH) in the Surtsey Test Facility: The IET-1 and IET-1R tests, 17:30899 (R;US)
ZION-2 REACTOR
Experiments to investigate the effects of 1:10 scale Zion structures on direct containment heating (DCH) in the Surtsey Test Facility: The IET-1 and IET-1R tests, 17:30899 (R;US)
ZIRCALOY
See also ALLOY-ZR98SN-4
Materials compatibility and corrosion issues for accelerator transmutation of waste, 17:30704 (R;US)
ZIRCON
Applied and theoretical study of textural and structural evolution of pure and doped zircon powders, 17:31257 (R;FR;In French)
ZIRCONATES
Fabrication, properties and tritium release rates of lithium zirconates: Paper presented at the 'Third International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93rd Annual Meeting of the American Ceramic Society', Cincinnati, Ohio, April 28-May 2, 1991, 17:32452 (R;NL)
ZIRCONIUM
Study of zirconium/stainless steel interface in tubular junctions made by eutectic diffusion, 17:31205 (R;FR)
ZIRCONIUM ALLOYS
Thermodynamic analysis of phase equilibria in the iron-zirconium system, 17:31204 (R;US)
ZIRCONIUM BORIDES
Alternate electrode materials for the SP100 reactor: Final report, 17:31263 (R;US)
ZIRCONIUM HYDROXIDES
Applied and theoretical study of textural and structural evolution of pure and doped zircon powders, 17:31257 (R;FR;In French)
Growth kinetics for the precipitation of zirconium hydroxide from aqueous zirconium and tin bearing solutions by the addition of ammonium hydroxide, 17:30741 (R;US)
ZIRCONIUM OXIDES
Model for impedance of an ionic conductor sandwiched between blocking electrodes, 17:31321 (R;US)
ZIRFLEX PROCESS
Growth kinetics for the precipitation of zirconium hydroxide from aqueous zirconium and tin bearing solutions by the addition of ammonium hydroxide, 17:30741 (R;US)

Contract Number Index

Numbers assigned to DOE contracts announced in documents in this publication are listed. Contract numbers are sorted alphanumerically and list the primary corporate author of the document cited, the citation number, and the report number or other document identification.

Contract No.	*Abstract No.*	*Report No.*
AC02-76CH00016	**Argonne National Lab., IL (United States)**	
	17:32152	ANL-HEP-CP–90-98
	Brookhaven National Lab., Upton, NY (United States)	
	17:30765	BNL–45080
	17:30853	BNL–47156
	17:30911	BNL-NUREG–47747
	17:30998	BNL–47769
	17:30999	BNL–47786
	17:31000	BNL-NUREG–47342
	17:31001	BNL-NUREG–47766
	17:31002	BNL-NUREG–47768
	17:31003	BNL-NUREG–47809
	17:31004	BNL-NUREG–47818
	17:31196	BNL–47088
	17:31248	BNL–47796
	17:31427	BNL–47142
	17:31428	BNL–47784
	17:31429	BNL–47785
	17:31446	BNL–47266
	17:31447	BNL–47267
	17:31448	BNL–47806
	17:31449	BNL–47813
	17:31474	BNL–47103
	17:31475	BNL–47104
	17:31476	BNL–47119
	17:31477	BNL–47148
	17:31478	BNL–47149
	17:31479	BNL–47799
	17:31480	BNL–47800
	17:31481	BNL–47811
	17:31529	BNL–47803
	17:31542	BNL–47776
	17:31687	BNL–47624
	17:32273	BNL–47764
	17:32274	BNL–47765
	17:32360	BNL–47814
	17:31059	BNL–47832
	Oak Ridge National Lab., TN (United States)	
	17:32245	CONF-920721–9
	Los Alamos National Lab., NM (United States)	
	17:31406	LA-UR–92-2464
AC02-76CH03000	**Argonne National Lab., IL (United States)**	
	17:32152	ANL-HEP-CP–90-98
	Fermi National Accelerator Lab., Batavia, IL (United States)	
	17:31603	FNAL-TM–1784
	17:32189	FNAL/C–92/165
AC02-76CH03073	**Columbia Univ., New York, NY (United States)**	
	17:32403	CONF-920913–7
	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	17:32434	PPPL–2850
	17:32435	PPPL-CFP–2654
	17:32468	PPPL-CFP–2621
AC02-76ER00038	**Notre Dame Univ., IN (United States). Radiation Lab.**	
	17:31324	DOE/ER/00038–3516
AC02-80ET15601	**Mississippi State Univ., MS (United States). Diagnostic Instrumentation and Analysis Lab.**	
	17:31076	CONF-9112129–1
	17:31077	DOE/ET/15601–42
AC02-80RA50219	**Southwest Research Inst., San Antonio, TX (United States)**	
	17:32004	DOE/RA/50219–21-Pt.1
	17:32005	DOE/RA/50219–21-Pt.2
AC02-83CH10093	**Solar Energy Research Inst., Golden, CO (United States)**	
	17:30807	PATENTS-US–A7642268
	National Renewable Energy Lab., Golden, CO (United States)	
	17:30801	DOE/CH/10093–152
	17:31064	DOE/CH/10093–149
	17:31115	NREL/TP–441-4824
	17:31146	DOE/CH/10093–107
	17:30793	DOE/CH/10093–147
	17:30821	NREL/TP–411-4995
	17:30822	NREL/TP–451-4938
	17:30823	NREL/TP–451-4962
	17:31128	DOE/CH/10093–135
AC02-86NV10510	**Argonne National Lab., IL (United States)**	
	17:31061	DOE/CH–9216
AC02-88ER80585	**OPTRA, Inc., Beverly, MA (United States)**	
	17:31610	CONF-9203173–1
AC02-91ER40605	**Arizona Univ., Tucson, AZ (United States)**	
	17:32068	DOE/ER/40605–2
AC03-76SF00098	**Argonne National Lab., IL (United States)**	
	17:32152	ANL-HEP-CP–90-98
	Oak Ridge National Lab., TN (United States)	
	17:32213	CONF-920721–7
	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	17:31465	SLAC-PUB–5742
	Lawrence Berkeley Lab., CA (United States)	
	17:31516	LBL–31041
	17:32042	LBL–27862
	17:32379	LBL–32305
	17:32181	SLAC-PUB–4596
	Lawrence Livermore National Lab., CA (United States)	
	17:31426	UCRL-JC–110209
AC03-76SF00515	**Stanford Linear Accelerator Center, Menlo Park, CA (United States)**	
	17:31440	SLAC-PUB–5844
	17:31441	SLAC-PUB–5864
	17:31442	SLAC-PUB–5875
	17:31464	SLAC-PUB–5725
	17:31465	SLAC-PUB–5742
	17:31466	SLAC-PUB–5830
	17:31522	SLAC-PUB–5800
	17:31523	SLAC-PUB–5822

Contract No.	Abstract No.	Report No.
	17:31524	SLAC-PUB-5848
	17:31525	SLAC-PUB-5862
	17:31526	SLAC-PUB-5863
	17:32047	SLAC-PUB-5733-Rev.
	17:32182	SLAC-PUB-4830
	17:32183	SLAC-PUB-5100
	17:32184	SLAC-PUB-5819
	17:32352	SLAC-PUB-5829
	Lawrence Berkeley Lab., CA (United States)	
	17:32181	SLAC-PUB-4596
AC03-89ER51114	**Lawrence Livermore National Lab., CA (United States)**	
	17:32474	UCRL-JC-108860
	17:32475	UCRL-JC-108861
	General Atomics, San Diego, CA (United States)	
	17:32459	GA-A-20914
AC03-89ER52153	**General Atomics, San Diego, CA (United States)**	
	17:32459	GA-A-20914
AC03-89ER53277	**General Atomics, San Diego, CA (United States)**	
	17:32426	GA-A-21007
AC03-89SF17885	**General Atomics, San Diego, CA (United States)**	
	17:30903	GA-A-20998
AC04-76DP00487	**Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (United States)**	
	17:31693	DOE/EA-0615
AC04-76DP00613	**Allied-Signal Aerospace Co., Kansas City, MO (United States). Kansas City Div.**	
	17:30703	KCP-613-4589
	17:31131	KCP-613-4801
	17:31132	KCP-613-4809
	17:31233	KCP-613-4901
	17:31320	BDX-613-3417
	17:31405	KCP-613-4679
	17:31608	KCP-613-4669
	17:31621	KCP-613-4807
	17:31622	KCP-613-4810
	17:32554	KCP-613-4972
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (United States)**	
	17:30587	SAND-92-1648C
	17:30646	SAND-92-1409C
	17:30647	SAND-92-1581
	17:30648	SAND-92-1645C
	17:30717	SAND-85-0004
	17:30718	SAND-91-1956
	17:30719	SAND-91-2795
	17:30720	SAND-91-2924C
	17:30721	SAND-91-7070
	17:30722	SAND-92-1226C
	17:30774	SAND-92-0472C
	17:30775	SAND-92-1580
	17:30830	SAND-92-0668
	17:30862	SAND-91-2228
	17:30899	SAND-92-0255
	17:30900	SAND-92-0663C
	17:30916	SAND-92-1200C
	17:30917	SAND-92-1566C
	17:31028	SAND-91-1222
	17:31029	SAND-91-2191C
	17:31030	SAND-91-2322
	17:31031	SAND-91-2692
	17:31045	SAND-92-0874
	17:31062	SAND-92-1391
	17:31143	SAND-92-1518C
	17:31240	SAND-91-2774C
	17:31241	SAND-92-1543C
	17:31242	SAND-92-1603C
	17:31278	SAND-92-1267C
	17:31279	SAND-92-1342C
	17:31364	SAND-92-1773C
	17:31365	SAND-92-1821C
	17:31401	SAND-92-1795C
	17:31416	SAND-92-0660C
	17:31417	SAND-92-0661C
	17:31418	SAND-92-0669C
	17:31419	SAND-92-0971C
	17:31463	SAND-91-1492C
	17:31626	SAND-88-0018-Rev.
	17:31627	SAND-91-2768C
	17:31628	SAND-92-0579C
	17:31634	SAND-91-2804C
	17:31635	SAND-92-0482
	17:31639	SAND-90-0351
	17:31640	SAND-92-1775C
	17:32016	SAND-91-2895C-Draft
	17:32061	SAND-92-1501C
	17:32374	SAND-91-2592C
	17:32392	SAND-92-0216C
	17:32469	SAND-91-0284
	17:32470	SAND-92-0370C
	17:32485	SAND-91-2391C
	17:32562	SAND-91-2907C
	17:32563	SAND-92-1655C
	17:30586	SAND-89-2612/Pt.A
	17:30669	DOE/NV/10576-T5
	17:30829	SAND-91-7017
	17:32366	SAND-92-1571C
	Lawrence Livermore National Lab., CA (United States)	
	17:32474	UCRL-JC-108860
	17:32475	UCRL-JC-108861
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering	
	17:31018	NUREG/CP-0120
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Safety Issue Resolution	
	17:31023	NUREG/CR-4832-Vol.3-Pt.2
AC04-76DR00789	**Sandia National Labs., Livermore, CA (United States)**	
	17:31157	SAND-92-8507
	17:32062	SAND-92-8491
	17:32564	SAND-92-8515C
AC04-86AL31950	**Westinghouse Electric Corp., Carlsbad, NM (United States). Waste Isolation Div.**	
	17:30678	DOE/WIPP-92-024
AC04-87AL43059	**Southwest Research Inst., San Antonio, TX (United States)**	
	17:31151	DOE/AL/43059-T5
	17:31152	DOE/AL/43059-T6
	17:31153	DOE/AL/43059-T7
	17:31154	DOE/AL/43059-T8
	17:31155	DOE/AL/43059-T9
AC04-88DP43495	**EG and G Mound Applied Technologies, Miamisburg, OH (United States)**	
	17:31632	MLM-3757(OP)
	Mound, Miamisburg, OH (United States)	
	17:31274	MLM-3751
	17:31414	MLM-3755
	17:31633	MLM-3758(OP)
AC05-76OR00001	**Martin Marietta Energy Systems, Inc., Piketon, OH (United States)**	
	17:31319	POEF-T-3599
AC05-76OR00033	**Oak Ridge National Lab., TN (United States)**	
	17:32245	CONF-920721-9

Contract No.	*Abstract No.*	*Report No.*
	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States)	
	17:31772	CONF-910529–
	17:31886	CONF-910529–
	17:31888	CONF-910529–
	17:31890	CONF-910529–
	17:31901	CONF-910529–
	17:31903	CONF-910529–
	17:31905	CONF-910529–
AC05-84OR21400	**Oak Ridge National Lab., TN (United States)**	
	17:30642	ORNL/M–1947
	17:30643	ORNL/TM–12000
	17:30644	CONF-9207102–58
	17:30659	CONF-921104–3
	17:30792	ORNL/TM–12184
	17:30869	DOE/RW–0184-R1-Vol.1
	17:30902	DOE/RW–0184-R1-Vol.4
	17:30956	CONF-921048–4
	17:30973	CONF-921110–2
	17:30975	DOE/RW–0184-R1-Vol.2
	17:30994	ORNL/M–1607
	17:31027	ORNL/ER–130
	17:31042	CONF-921110–9
	17:31049	ORNL/TM–11664
	17:31060	CONF-9208124–1
	17:31096	CONF-921152–1
	17:31119	CONF-9209176–1
	17:31124	CONF-921104–2
	17:31187	ORNL–6715
	17:31215	CONF-920305–14
	17:31216	CONF-9206234–1
	17:31217	CONF-9206238–1
	17:31218	CONF-9209174–1
	17:31219	CONF-921036–5
	17:31254	CONF-920448–7
	17:31268	CONF-920694–2
	17:31269	CONF-9209162–1
	17:31311	CONF-921104–1
	17:31312	CONF-921186–1
	17:31321	CONF-9207124–1
	17:31330	CONF-920808–5
	17:31332	DOE/RW–0184-R1-Vol.3
	17:31352	CONF-9207102–49
	17:31353	CONF-9207102–60
	17:31354	CONF-921102–9-Extd.Abst.
	17:31355	CONF-921102–10
	17:31386	CONF-921110–15
	17:31430	CONF-9203164–2
	17:31587	ORNL/TM–11882
	17:31590	ORNL/TM–11882
	17:31613	PATENTS-US–A7645448
	17:31642	ORNL/TM–12002
	17:31691	CONF-9110402–1
	17:31692	CONF-9206224–1
	17:31699	ES/ER/TM–33
	17:31726	ORNL/TM–11977
	17:31749	CONF-9206254–2
	17:32049	CONF-9207117–1
	17:32213	CONF-920721–7
	17:32243	CONF-9205108–12
	17:32244	CONF-920721–8
	17:32245	CONF-920721–9
	17:32276	CONF-9106158–1
	17:32278	CONF-921144–1
	17:32387	CONF-9205236–3
	17:32404	CONF-9209181–1
	17:32405	CONF-921125–1
	17:32433	ORNL/TM–12075
	17:32511	CONF-9206152–1
	17:32512	CONF-9209109–2
	17:32514	CONF-9210148–1
	17:32558	ORNL/TM–11900
	17:32559	ORNL/TM–12147
	17:30645	ORNL/ER/Sub–92-SK263/1
	17:30670	DOE/OR–1047-D1
	17:31260	ORNL/Sub–87-SA946/02
	17:32277	CONF-921102–3
	17:32576	ORNL/ER/Sub–87-99053/50
	Oak Ridge Y-12 Plant, TN (United States)	
	17:31368	Y/EN–4452
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering	
	17:30877	NUREG/CR–5779-Vol.1
	17:30904	NUREG/CR–5810
	17:30947	NUREG/CR–4819-Vol.2
	17:31025	NUREG/CR–5700
	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States)	
	17:31879	CONF-910529–
	17:31889	CONF-910529–
	17:31908	CONF-910529–
	Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States)	
	17:31253	CONF-920402–49
	17:32513	CONF-9210136–2
	General Atomics, San Diego, CA (United States)	
	17:32459	GA-A–20914
	Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States). Center for Natural Phenomena Engineering	
	17:31370	Y/EN–4671/R2
AC05-84OS21400	**Oak Ridge National Lab., TN (United States)**	
	17:30746	Y/ER–17
	Oak Ridge Y-12 Plant, TN (United States)	
	17:30745	Y/ER–16
	17:30754	Y/WM–123
	17:31284	Y/EN–4325
	17:31369	Y/EN–4666
	17:32353	Y/DD–564
	17:32570	Y/CSD/INF–92/8
	17:30753	Y/Sub–92-99928C/2
AC05-84OT21400	**Oak Ridge K-25 Site, TN (United States)**	
	17:32575	K/CSD/TM–101
	Oak Ridge K-25 Site, TN (United States). UEO Enrichment Technical Operations Div.	
	17:31317	K/ETO–93
AC06-76RL01830	**Atlantic Richfield Hanford Co., Richland, WA (United States)**	
	17:30635	ARH–59-Del.
	17:30636	ARH–60-Del.
	17:30637	ARH–309-Del.
	17:30650	ARH–307-Del.
	Douglas United Nuclear, Inc., Richland, WA (United States)	
	17:30980	DUN–2634-RD
	17:30981	DUN–4440-RD
	17:31007	DUN–7038-RD
	Hanford Works, Richland, WA (United States)	
	17:30755	HW–7405
	17:30984	HW–12283
	Oak Ridge National Lab., TN (United States)	
	17:31990	ORNL/TM–11882
	17:32535	ESTSC–000456U110000

Contract No.	*Abstract No.*	*Report No.*
	17:32536	ESTSC–000457U110000
	Battelle Pacific Northwest Lab., Richland, WA (United States)	
	17:31999	PNWD–1975-HEDR
	General Electric Co., Richland, WA (United States). Hanford Atomic Products Operation	
	17:30967	RL-REA–922
	17:30985	HW–38375-Del.
	17:30987	HW–39751-Del.
	17:30988	HW–66648
	17:30989	HW–69583
	17:30990	HW–78039
	Pacific Northwest Lab., Richland, WA (United States)	
	17:30711	PNL–7645
	17:30712	PNL-SA–20275
	17:30713	PNL-SA–20430
	17:30714	PNL-SA–20460
	17:30715	PNL-SA–21033
	17:30948	PNL-SA–19682
	17:30969	BNWL-CC–224-Add.
	17:31057	PNL-SA–20781
	17:31088	PNL-SA–21162
	17:31117	PNL-SA–20969
	17:31142	PNL-SA–20310
	17:31237	PNL-SA–19946
	17:31277	PNL-SA–21006
	17:31307	PNL-SA–21138
	17:31620	PNL-SA–21150
	17:31623	PNL-SA–20626
	17:31624	PNL-SA–20720
	17:31625	PNL-SA–20954
	17:31668	PNL-SA–20809
	17:31727	PNL-SA–20622
	17:31728	PNL-SA–20742
	17:31762	PNL-SA–20437
	17:31763	PNL-SA–20440
	17:31764	PNL-SA–20444
	17:31765	PNL-SA–20446
	17:31994	PNL–8236
	17:31995	PNL-SA–20453
	17:31996	PNL-SA–20943
	17:31997	PNL-SA–21038
	17:31998	PNL-SA–21090
	17:32000	PNWD–1980-01-HEDR
	17:32001	PNWD–1992-HEDR
	17:32006	PNL-SA–20368
	17:32015	PNL-SA–21206
	17:32466	PNL-SA–19945
	17:32467	PNL-SA–19956
	17:32497	PNL-SA–20410
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering	
	17:30921	NUREG/CR–4469-Vol.13
	17:30962	NUREG/CR–6001
	17:31020	NUREG/CR–3320-Vol.2
	17:31022	NUREG/CR–4469-Vol.14
	Hanford Atomic Products Operation, Richland, WA (United States)	
	17:30986	HW–38808
AC06-77RL01030	**Rockwell International Corp., Richland, WA (United States). Rockwell Hanford Operations**	
	17:30660	DOE/EA–0210
AC06-87RL10930	**Westinghouse Hanford Co., Richland, WA (United States)**	
	17:30649	WHC-SA–1570
	17:30674	DOE/RL–92-34
	17:30739	WHC-EP–0399-Rev.2
	17:30757	WHC-EP–0541
	17:31063	WHC-SA–1584
	17:30740	WHC-EP–0514
	USDOE Richland Field Office, WA (United States)	
	17:30671	DOE/RL–88-27-Rev.2-Vol.2
	17:30672	DOE/RL–88-27-Rev.2-Vol.3
	17:30673	DOE/RL–88-27-Rev.2-Vol.4
	17:30779	DOE/RL–92-15
AC06-91RL11946	**United Engineers and Constructors, Inc., Englewood, CO (United States). Western Operations**	
	17:30675	DOE/RL/11946–2-Vol.1
	17:30676	DOE/RL/11946–2-Vol.3
	17:30677	DOE/RL/11946–2-Vol.5
AC07-76ID01570	**Geological Survey, Idaho Falls, ID (United States)**	
	17:31752	DOE/ID–22102
	EG and G Idaho, Inc., Idaho Falls, ID (United States)	
	17:30663	DOE/ID–10382-App.A-F
	17:30686	EGG-M–92047
	17:30759	EGG-SSRE–9300
	17:30914	EGG-M–92359
	17:30941	EGG-M–91449
	17:30942	EGG-M–92451
	17:31008	EGG-M–91413
	17:31009	EGG-M–91432
	17:31010	EGG-MS–10247
	17:31011	EGG-NE–10289
	17:31129	EGG-M–92026
	17:31160	EGG-M–92261
	17:31228	EGG-M–91349
	17:31262	PATENTS-US–A7642578
	17:31276	PATENTS-US–A7641945
	17:31358	EGG-M–92300
	17:31388	EGG-M–91505
	17:31389	EGG-M–92200
	17:31390	EGG-M–92378
	17:31609	PATENTS-US–A7643320
	17:31648	EGG-WTD–10320
	17:31697	EGG-BEG–8811
	17:32007	EGG-M–92025
	17:32455	EGG-FSP–10262
	17:32456	EGG-FSP–10347
	17:32457	EGG-M–91508
	17:32490	EGG-M–92340
	17:32518	EGG-M–91471
	17:30665	DOE/LLW–111-Draft
	17:31698	EGG-GEO–10330
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering	
	17:30993	NUREG/CR–5646
	17:31024	NUREG/CR–5378
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Systems Research	
	17:31021	NUREG/CR–4391
	EG and G Idaho, Inc., Idaho Falls, ID (United States). National Low-Level Waste Management Program	
	17:30666	DOE/LLW–141
	17:30667	DOE/LLW–146
AC07-84ID12435	**Westinghouse Idaho Nuclear Co., Inc., Idaho Falls, ID (United States)**	
	17:30741	WINCO–11562
	17:30742	WINCO–11730
	17:30763	WINCO–11844
	17:31308	WINCO–11509
	17:31309	WINCO–11722

Contract No.	*Abstract No.*	*Report No.*
AC07-85NV10418	**Ford Motor Co., Dearborn, MI (United States). Research Staff**	
	17:31186	DOE/NV/10418–3
AC08-83NV10282	**Sandia National Labs., Albuquerque, NM (United States)**	
	17:30669	DOE/NV/10576–T5
	EG and G Energy Measurements, Inc., Las Vegas, NV (United States)	
	17:31415	PATENTS-US–A7643304
AC08-87NV10576	**Sandia National Labs., Albuquerque, NM (United States)**	
	17:30669	DOE/NV/10576–T5
	USDOE Yucca Mountain Site Characterization Project Office, Las Vegas, NV (United States)	
	17:30668	DOE/NV/10576–T4
AC08-88NV10517	**Lawrence Livermore National Lab., CA (United States)**	
	17:31677	UCRL-JC–110377
	EG and G, Inc., Goleta, CA (United States). Santa Barbara Operations	
	17:30579	EGG–10617-2118
	EG and G Energy Measurements, Inc., Las Vegas, NV (United States)	
	17:31415	PATENTS-US–A7643304
AC09-76SR00001	**Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States). Savannah River Lab.**	
	17:30976	DPSP–70-1096
	Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States)	
	17:30979	DPW–6643
	Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Atomic Energy Div.	
	17:31224	DPW–5189
	Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept.	
	17:30958	DPW–6545
	17:30977	DPW–6485
	17:30978	DPW–6546
	17:31356	DPW–6512
	17:31357	DPW–6535
	Savannah River Lab., Aiken, SC (United States). Technical Div.	
	17:31006	DPST–72-400
	Westinghouse Savannah River Co., Aiken, SC (United States)	
	17:31038	WSRC-RD–91-24
AC09-89SR18035	**Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States)**	
	17:31696	DPSP–88-1002-Vol.2
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (United States). Savannah River Lab.	
	17:30976	DPSP–70-1096
	Savannah River Lab., Aiken, SC (United States). Technical Div.	
	17:31006	DPST–72-400
	Westinghouse Savannah River Co., Aiken, SC (United States)	
	17:30743	WSRC-MS–92-279
	17:30744	WSRC-RP–91-1151
	17:30764	WSRC-MS–92-286
	17:30773	PATENTS-US–A7643305
	17:30938	WSRC-MS–92-269
	17:30950	WSRC-MS–92-193
	17:30963	WSRC-MS–92-180
	17:30996	WSRC-TR–90-471
	17:31033	WSRC-MS–92-046
	17:31034	WSRC-MS–92-047
	17:31035	WSRC-MS–92-112
	17:31036	WSRC-MS–92-181
	17:31037	WSRC-MS–92-231
	17:31038	WSRC-RD–91-24
	17:31039	WSRC-TR–92-42-003
	17:31040	WSRC-TR–92-42-011
	17:31141	PATENTS-US–A7641823
	17:31150	PATENTS-US–A7643317
	17:31306	PATENTS-US–A7643316
	17:31367	WSRC-RP–91-1059
	17:31611	PATENTS-US–A7641978
	17:31680	WSRC-MS–92-236
	17:31748	WSRC-MS–92-205
	17:32501	WSRC-MS–92-249
	17:32568	WSRC-IM–90-83-6-Rev.
	17:32569	WSRC-IM–92-23
AC21-86MC23075	**Advanced Fuel Research, Inc., East Hartford, CT (United States)**	
	17:30542	DOE/MC/23075–2974
AC21-87MC11089	**Institute of Gas Technology, Chicago, IL (United States)**	
	17:30599	DOE/MC/11089–3094-Vol.1
	17:30600	DOE/MC/11089–3094-Vol.2
AC21-87MC23286	**SRI International, Menlo Park, CA (United States). Molecular Physics Lab.**	
	17:30435	DOE/MC/23286–3093
AC21-88MC24221	**International Fuel Cells Corp., South Windsor, CT (United States)**	
	17:31082	DOE/MC/24221–92/C0056
AC21-88MC25167	**Westinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Conversion Dept.**	
	17:31083	DOE/MC/25167–2986
AC21-89MC26026	**College of West Virginia, Beckley, WV (United States)**	
	17:30588	DOE/MC/26026–C0042
AC21-89MC26343	**Columbia Gas System Service Corp., Columbus, OH (United States)**	
	17:30589	DOE/MC/26343–3084
AC21-90MC26364	**Institute of Gas Technology, Chicago, IL (United States)**	
	17:31296	DOE/MC/26364–3101
AC21-90MC27168	**Energy Research Corp., Danbury, CT (United States)**	
	17:31084	DOE/MC/27168–92/C0051
AC21-90MC27394	**M-C Power Corp., Burr Ridge, IL (United States)**	
	17:31085	DOE/MC/27394–92/C0050
AC22-87PC90005	**Air Products and Chemicals, Inc., Allentown, PA (United States)**	
	17:30452	DOE/PC/90005–T59
AC22-88PC88812	**Colorado School of Mines, Golden, CO (United States). Dept. of Chemical Engineering and Petroleum Refining**	
	17:30455	DOE/PC/90289–T5
AC22-88PC88859	**Louisiana State Univ., Baton Rouge, LA (United States)**	
	17:30544	DOE/PC/88859–T12
AC22-89BC14471	**Alaska Univ., Fairbanks, AK (United States). Geophysical Inst.**	
	17:30560	DOE/BC/14471–12
AC22-89PC88400	**USDOE Pittsburgh Energy Technology Center, PA (United States)**	
	17:32522	ESTSC–000218IBMPC01
AC22-89PC89797	**Westinghouse Electric Corp., Pittsburgh, PA (United States). Advanced Energy Systems Dept.**	
	17:30537	WAES-TR–92-0004

Contract No.	*Abstract No.*	*Report No.*
AC22-89PC89881	**Geo-Microbial Technologies, Inc., Ochelata, OK (United States)**	
	17:30447	DOE/PC/89881–T4
	17:30448	DOE/PC/89881–T5
	17:30449	DOE/PC/89881–T6
	17:30450	DOE/PC/89881–T7
	17:30451	DOE/PC/89881–T8
AC22-90BC14476	**Blackhawk Geosciences, Inc., Golden, CO (United States)**	
	17:30561	DOE/BC/14476–11
AC22-90BC14660	**Texas Univ., Austin, TX (United States)**	
	17:30570	DOE/BC/14660–T1
AC22-90PC89857	**Bechtel, Inc., Houston, TX (United States)**	
	17:30441	DOE/PC/89857–T1
	17:30442	DOE/PC/89857–T2
	17:30443	DOE/PC/89857–T4
	17:30444	DOE/PC/89857–T5
	17:30445	DOE/PC/89857–T6
	17:30446	DOE/PC/89857–T7
AC22-90PC90036	**SRI International, Menlo Park, CA (United States)**	
	17:30453	DOE/PC/90036–T4
AC22-90PC90047	**Altamira Instruments, Inc., Pittsburgh, PA (United States)**	
	17:30454	DOE/PC/90047–T4
AC22-91PC90181	**New Jersey Inst. of Tech., Newark, NJ (United States)**	
	17:30534	CONF-921110–6
AC22-91PC90182	**Florida Univ., Gainesville, FL (United States)**	
	17:30535	DOE/PC/90182–T5
AC22-91PC90185	**USDOE Pittsburgh Energy Technology Center, PA (United States)**	
	17:30528	CONF-9110369–
AC22-91PC91042	**Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering**	
	17:30430	CONF-920444–34
	17:30431	CONF-920444–35
AC22-91PC91044	**SRI International, Menlo Park, CA (United States). Molecular Physics Lab.**	
	17:30457	DOE/PC/91044–T1
AC34-90DP62349	**Lawrence Livermore National Lab., CA (United States)**	
	17:30738	UCRL-JC–109993
	EG and G Rocky Flats, Inc., Golden, CO (United States). Rocky Flats Plant	
	17:30716	RFP–4604
	17:30762	RFP–4592
	17:31238	RFP–4450
	17:31239	RFP–4581
	17:31362	RFP–4504
	17:31363	RFP–4608
	17:32002	RFP–4590
	17:32561	RFP–4614
AC35-89ER40486	**Superconducting Super Collider Lab., Dallas, TX (United States)**	
	17:31443	SSCL–428
	17:31467	SSCL–512
	17:31468	SSCL–578
	17:31469	SSCL–580
	17:31527	SSCL–576
	17:31528	SSCL–583
	17:32128	SSCL-Preprint–123
	Universities Research Association, Waxahachie, TX (United States)	
	17:31444	SSCL-SR–1213
AC79-91BP12031	**Montgomery (James M.), Inc., Bellevue, WA (United States)**	
	17:30817	DOE/BP/12031–1
AI01-83IG00049	**National Inst. of Standards and Technology, Gaithersburg, MD (United States)**	
	17:32509	CONF-9105126–7
AI08-92NV10674	**Geological Survey, Denver, CO (United States)**	
	17:31747	USGS-OFR–92-137
AI79-84BP16475	**Forest Service, WY (United States). Nez Perce National Forest**	
	17:30818	DOE/BP/16475–2
AS05-76ER03346	**Oak Ridge National Lab., TN (United States)**	
	17:32245	CONF-920721–9
AS05-76ER03948	**Texas Univ., Houston, TX (United States). Dept. of Physics**	
	17:32155	DOE/ER/03948–19
BI79-90BP07103	**Montana State Univ., Bozeman, MT (United States)**	
	17:31750	DOE/BP/07103–2
FC07-89ID12781	**Energy and Environmental Research Corp., Irvine, CA (United States)**	
	17:31256	DOE/ID/12781–2
FC21-86MC11076	**Western Research Inst., Laramie, WY (United States)**	
	17:30421	DOE/MC/11076–92/C0041
FC21-89MC25137	**Colorado-Ute Electric Association, Inc., Montrose, CO (United States)**	
	17:30543	DOE/MC/25137–3088
FC22-83FE60149	**National Inst. for Petroleum and Energy Research, Bartlesville, OK (United States)**	
	17:30574	NIPER–617
FC22-90PC89661	**TransAlta Technologies, Inc., Marion, IL (United States)**	
	17:30545	DOE/PC/89661–T4
	17:30546	DOE/PC/89661–T5
	17:30547	DOE/PC/89661–T8
FC22-91PC90546	**Bechtel Corp., San Francisco, CA (United States)**	
	17:30484	DOE/PC/90546–T4
FC22-91PC90550	**Public Service Co. of Colorado, Denver, CO (United States)**	
	17:30865	DOE/PC/90550–T6
FC79-88BP38906	**Public Utility District No. 1 of Chelan County, Wenatchee, WA (United States). Power Operations Dept.**	
	17:30819	DOE/BP/38906–1
FG01-90CE15440	**Doty Scientific, Inc., Columbia, SC (United States)**	
	17:31125	DOE/CE/15440–T5
FG01-91CE15525	**Advanced Cooling Technology, Inc., Lexington, KY (United States)**	
	17:31097	DOE/CE/15525–T3
FG02-84ER13181	**Utah Univ., Salt Lake City, UT (United States). Dept. of Mechanical Engineering**	
	17:31295	DOE/ER/13181–T3
FG02-84ER45167	**Brown Univ., Providence, RI (United States)**	
	17:31255	DOE/ER/45167–T2
FG02-85ER40231	**Syracuse Univ., NY (United States)**	
	17:32066	DOE/ER/40231–T12
FG02-85ER53198	**Wisconsin Univ., Madison, WI (United States)**	
	17:32411	DOE/ER/53198–201
	Wisconsin Univ., Madison, WI (United States). Dept. of Physics	
	17:32412	DOE/ER/53198–202
	17:32413	DOE/ER/53198–203
FG02-86ER13505	**Cornell Univ., Ithaca, NY (United States)**	
	17:30797	DOE/ER/13505–3
FG02-86ER13519	**Cornell Univ., Ithaca, NY (United States)**	
	17:32357	DOE/ER/13519–6

Contract No.	Abstract No.	Report No.
FG02-86ER13551	Wisconsin Univ., Madison, WI (United States). Dept. of Chemical Engineering	
	17:31313	DOE/ER/13551–T1
FG02-86ER13556	USDOE Pittsburgh Energy Technology Center, PA (United States)	
	17:31383	CONF-9110369–
FG02-86ER13622	Connecticut Univ., Storrs, CT (United States)	
	17:31314	DOE/ER/13622–T2
FG02-86ER13636	Massachusetts Inst. of Tech., Cambridge, MA (United States). Earth Resources Lab.	
	17:30562	DOE/ER/13636–T2
FG02-86ER45247	Argonne National Lab., IL (United States)	
	17:32381	ANL/CP–76653
FG02-86ER53223	New York Univ., NY (United States). Courant Inst. of Mathematical Sciences	
	17:32414	DOE/ER/53223–180
	17:32415	DOE/ER/53223–194
FG02-87ER13772	Massachusetts Univ., Amherst, MA (United States). Dept. of Chemical Engineering	
	17:31315	DOE/ER/13772–5
FG02-87ER25027	Northwestern Univ., Evanston, IL (United States)	
	17:31345	DOE/ER/25027–6
FG02-87ER40315	Carnegie-Mellon Univ., Pittsburgh, PA (United States)	
	17:32067	DOE/ER/40315–195
FG02-87ER40335	Colorado Univ., Boulder, CO (United States)	
	17:32206	DOE/ER/40335–13
FG02-87ER40346	Argonne National Lab., IL (United States)	
	17:32240	ANL/CP–76821
	17:32272	ANL/CP–76820
FG02-87ER45320	Cornell Univ., Ithaca, NY (United States)	
	17:31222	DOE/ER/45320–5
FG02-87ER60526	Massachusetts Univ. Medical Center, Worcester, MA (United States)	
	17:31824	DOE/ER/61150–1
FG02-87ER60600	New England Medical Center, Boston, MA (United States)	
	17:31775	DOE/ER/60600–1
	17:31910	DOE/ER/60600–2
FG02-87ER60614	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States)	
	17:31892	CONF-910529–
FG02-87ER75360	Ames Lab., IA (United States)	
	17:30974	DOE/ER/75360–4
FG02-88ER25065	Harvard Univ., Cambridge, MA (United States)	
	17:32073	DOE/ER/25065–3
FG02-88ER52149	Wisconsin Univ., Madison, WI (United States)	
	17:32393	DOE/ER/52149–4
FG02-88ER60725	Chicago Univ., IL (United States)	
	17:31776	DOE/ER/60725–1
	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States)	
	17:31892	CONF-910529–
FG02-89ER12900	Illinois Univ., Urbana, IL (United States). Dept. of Nuclear Engineering	
	17:31005	DOE/ER/12900–3
FG02-89ER40531	Kent State Univ., OH (United States). Dept. of Physics	
	17:32281	DOE/ER/40531–3
FG02-89ER45401	Harvard Univ., Cambridge, MA (United States). Div. of Applied Sciences	
	17:31270	DOE/ER/45401–3
FG02-89ER51124	Columbia Univ., New York, NY (United States)	
	17:32403	CONF-920913–7
FG02-89ER53297	Columbia Univ., New York, NY (United States)	
	17:32403	CONF-920913–7
	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	17:32434	PPPL–2850
FG02-89ER60846	Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Civil and Environmental Engineering	
	17:31751	DOE/ER/60846–3
FG02-89ER69027	Colorado State Univ., Fort Collins, CO (United States). Dept. of Atmospheric Science	
	17:31646	DOE/ER/69027–3
FG02-90ER14145	Colorado Univ., Boulder, CO (United States)	
	17:32358	DOE/ER/14145–T1
FG02-90ER14147	Purdue Univ., Lafayette, IN (United States). School of Nuclear Engineering	
	17:31387	DOE/ER/14147–2
FG02-90ER40553	Mount Holyoke Coll., South Hadley, MA (United States)	
	17:32246	DOE/ER/40553–3
FG02-90ER61006	Johns Hopkins Univ., Baltimore, MD (United States). School of Medicine	
	17:31331	DOE/ER/61006–T1
FG02-90ER61029	Clarkson Univ., Potsdam, NY (United States). Dept. of Chemistry	
	17:31912	DOE/ER/61029–9
FG02-90ER75603	Teachers Academy for Mathematics and Science, Chicago, IL (United States)	
	17:32481	DOE/ER/75603–1
FG02-90ER80910	Eltron Research, Inc., Aurora, IL (United States)	
	17:31080	DOE/ER/80910–92/C0058
FG02-91ER14205	Cornell Univ., Ithaca, NY (United States). Lab. of Atomic and Solid State Physics	
	17:31323	DOE/ER/14205–1
FG02-91ER14220	Dartmouth Coll., Hanover, NH (United States). Thayer School of Engineering	
	17:31221	DOE/ER/14220–1
FG02-91ER40661	Indiana Univ., Bloomington, IN (United States). Dept. of Physics	
	17:32069	DOE/ER/40661–3
FG02-91ER45439	Argonne National Lab., IL (United States)	
	17:31201	ANL/CP–74789
FG02-91ER61242	Children's Hospital of Philadelphia, PA (United States)	
	17:31767	DOE/ER/61242–2
FG02-91ER75657	Kentucky Univ., Lexington, KY (United States). Research Foundation	
	17:32482	DOE/ER/75657–1
FG02-92ER40697	State Univ. of New York, Albany, NY (United States). Research Foundation	
	17:31549	DOE/ER/40697–1
FG02-92ER40704	Yale Univ., New Haven, CT (United States). Dept. of Physics	
	17:32188	CONF-920126–4
FG03-86ER53225	California Univ., Los Angeles, CA (United States). Dept. of Physics	
	17:32416	DOE/ER/53225–T3
FG03-86SF16592	Chicago Univ., IL (United States). Enrico Fermi Inst.	
	17:30828	DOE/SF/16592–T1
FG03-87ER13727	California Univ., Berkeley, CA (United States). Electronics Research Lab.	
	17:32410	DOE/ER/13727–T2

Contract No.	Abstract No.	Report No.
FG03-88ER53280	**Krall Associates, Del Mar, CA (United States)**	
	17:32448	DOE/ER/53280–6
FG03-91ER61215	**California Univ., San Diego, La Jolla, CA (United States)**	
	17:32515	DOE/ER/61215–1
FG05-80ET53088	**Texas Univ., Austin, TX (United States). Inst. for Fusion Studies**	
	17:32050	DOE/ET/53088–562
	17:32418	DOE/ET/53088–556
	17:32419	DOE/ET/53088–560
	17:32420	DOE/ET/53088–561
	17:32421	DOE/ET/53088–565
FG05-84ER40159	**Oak Ridge National Lab., TN (United States)**	
	17:32245	CONF-920721–9
FG05-86ER40270	**George Washington Univ., Washington, DC (United States). Center for Nuclear Studies**	
	17:32205	DOE/ER/40270–36
FG05-87ER13728	**North Carolina State Univ., Raleigh, NC (United States). Dept. of Mechanical and Aerospace Engineering**	
	17:31344	DOE/ER/13728–4
FG05-87ER13771	**Texas Univ., Houston, TX (United States)**	
	17:31645	DOE/ER/13771–1
FG05-87ER40361	**Oak Ridge National Lab., TN (United States)**	
	17:32243	CONF-9205108–12
	17:32244	CONF-920721–8
	17:32245	CONF-920721–9
FG05-87ER60503	**Louisiana State Univ., Baton Rouge, LA (United States)**	
	17:31761	DOE/ER/60503–353
	Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Chemistry	
	17:31760	DOE/ER/60503–352
FG05-88ER40407	**Oak Ridge National Lab., TN (United States)**	
	17:32245	CONF-920721–9
FG05-88ER40418	**Oak Ridge National Lab., TN (United States)**	
	17:32245	CONF-920721–9
FG05-88ER53279	**National Academy of Sciences, Washington, DC (United States). Board on Physics and Astronomy**	
	17:32417	DOE/ER/53279–2
FG05-88ER60707	**American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA (United States)**	
	17:31891	CONF-910529–
	17:31893	CONF-910529–
	17:31895	CONF-910529–
	17:31896	CONF-910529–
FG05-89ER60894	**Duke Univ. Medical Center, Durham, NC (United States). Dept. of Radiology**	
	17:31777	DOE/ER/60894–3
	17:31778	DOE/ER/60894–4
FG05-90ER60951	**National Council on Radiation Protection and Measurements, Bethesda, MD (United States)**	
	17:31911	DOE/ER/60951–3
FG05-91ER81156	**Jet Process Corp., New Haven, CT (United States)**	
	17:31081	DOE/ER/81156–92/C0059
FG05-92ER40694	**Tennessee Technological Univ., Cookeville, TN (United States). Dept. of Physics**	
	17:32242	CONF-9110236–8
FG06-90ER40561	**Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory**	
	17:32207	DOE/ER/40561–68
	17:32208	DOE/ER/40561–68-INT92
FG06-90ER45415	**Washington Univ., Seattle, WA (United States)**	
	17:32355	DOE/ER/45415–3
FG07-88ER12819	**Ohio State Univ., Columbus, OH (United States). Nuclear Engineering Program**	
	17:30957	DOE/ER/12819–T2
FG07-90ID12934	**Stanford Univ., CA (United States). Stanford Geothermal Program**	
	17:30846	DOE/ID/12934–1
	17:30847	DOE/ID/12934–2
	17:30848	DOE/ID/12934–3
	17:30849	DOE/ID/12934–4
FG09-88ER60627	**Skidaway Inst. of Oceanography, Savannah, GA (United States)**	
	17:31695	DOE/ER/60627–4
FG21-90MC27225	**Arkansas Univ., Fayetteville, AR (United States). Coll. of Engineering**	
	17:30436	DOE/MC/27225–T5
FG22-86PC90505	**Arizona Univ., Tucson, AZ (United States). Dept. of Chemical Engineering**	
	17:30548	DOE/PC/90505–T7
	17:30549	DOE/PC/90505–T8
FG22-87PC79924	**Case Western Reserve Univ., Cleveland, OH (United States). Dept. of Chemical Engineering**	
	17:31297	DOE/PC/79924–T3
FG22-87PC79931	**Texas A and M Univ., College Station, TX (United States). Dept. of Chemical Engineering**	
	17:31086	DOE/PC/79931–T13
FG22-88PC88923	**Iowa State Univ. of Science and Technology, Ames, IA (United States). Dept. of Chemistry**	
	17:30465	DOE/PC/88923–T4
	17:30466	DOE/PC/88923–T5
	17:30467	DOE/PC/88923–T6
	17:30468	DOE/PC/88923–T7
	17:30469	DOE/PC/88923–T8
FG22-88PC88939	**Utah Univ., Salt Lake City, UT (United States). Dept. of Mining Engineering**	
	17:30470	DOE/PC/88939–T3
FG22-89BC14250	**Illinois State Geological Survey, Champaign, IL (United States)**	
	17:30566	DOE/BC/14250–12
FG22-89BC14447	**New Mexico Inst. of Mining and Technology, Socorro, NM (United States). New Mexico Petroleum Recovery Research Center**	
	17:30567	DOE/BC/14447–15
FG22-89PC89767	**Yale Univ., New Haven, CT (United States). Dept. of Chemical Engineering**	
	17:30437	DOE/PC/89767–T5
FG22-89PC89769	**USDOE Pittsburgh Energy Technology Center, PA (United States)**	
	17:30530	CONF-9110369–
FG22-89PC89772	**Boston Univ., MA (United States). School of Medicine**	
	17:30438	DOE/PC/89772–T12
FG22-89PC89773	**Massachusetts Inst. of Tech., Cambridge, MA (United States)**	
	17:30439	DOE/PC/89773–T1
	17:30440	DOE/PC/89773–T2
FG22-89PC89778	**Minnesota Univ., Minneapolis, MN (United States). Dept. of Civil and Mineral Engineering**	
	17:30479	DOE/PC/89778–T5
	17:30480	DOE/PC/89778–T6
	Minnesota Univ., Minneapolis, MN (United States). Mineral Resources Research Center	
	17:30476	DOE/PC/89778–T1

Contract No.	Abstract No.	Report No.
	17:30477	DOE/PC/89778–T3
	17:30481	DOE/PC/89778–T7
	17:30482	DOE/PC/89778–T8
	Minnesota Univ., St. Paul, MN (United States). Mineral Resources Research Center	
	17:30478	DOE/PC/89778–T4
FG22-89PC89782	**Oklahoma Univ., Norman, OK (United States). School of Civil Engineering and Environmental Science**	
	17:31753	DOE/PC/89782–T8
FG22-89PC89784	**Lehigh Univ., Bethlehem, PA (United States)**	
	17:30483	DOE/PC/89784–11
FG22-90BC14600	**Stanford Univ., CA (United States). Petroleum Research Inst.**	
	17:30568	DOE/BC/14600–32
	17:30569	DOE/BC/14600–33
FG22-90PC90284	**Alabama Univ., University, AL (United States). Dept. of Chemistry**	
	17:30461	CONF-920815–4
FG22-90PC90289	**Colorado School of Mines, Golden, CO (United States). Dept. of Chemical Engineering and Petroleum Refining**	
	17:30455	DOE/PC/90289–T5
FG22-90PC90304	**Lehigh Univ., Bethlehem, PA (United States). Dept. of Chemistry**	
	17:30456	DOE/PC/90304–T2
FG22-90PC90308	**Brown Univ., Providence, RI (United States). Div. of Engineering**	
	17:30425	DOE/PC/90308–6
FG22-90PC90309	**Tennessee Univ., Tullahoma, TN (United States). Space Inst.**	
	17:30864	DOE/PC/90309–7
FG22-90PC90313	**Michigan Univ., Ann Arbor, MI (United States)**	
	17:30428	CONF-920444–32
	17:30429	CONF-920444–33
FG22-91PC91292	**Grambling State Univ., LA (United States). Dept. of Chemistry**	
	17:30472	DOE/PC/91292–T3
FG22-91PC91305	**Brown Univ., Providence, RI (United States). Div. of Engineering**	
	17:30473	DOE/PC/91305–2
FG22-91PC91308	**Brigham Young Univ., Provo, UT (United States)**	
	17:30550	DOE/PC/91308–3
FG22-91PC91334	**Illinois Univ., Urbana, IL (United States)**	
	17:30551	DOE/PC/91334–T47
	Illinois State Geological Survey, Champaign, IL (United States)	
	17:30426	DOE/PC/91334–T55
	17:30458	DOE/PC/91334–T57
	17:30459	DOE/PC/91334–T58
	17:30552	DOE/PC/91334–T49
W-31109-ENG-38	**Argonne National Lab., IL (United States)**	
	17:30475	ANL/CP–76723
	17:30536	PATENTS-US–A7642270
	17:30578	ANL/CP–75350
	17:30654	ANL/CP–75688
	17:30781	ANL/CP–76789
	17:30901	ANL/CP–75204
	17:30910	ANL/CP–74685
	17:30997	ANL/CP–75321
	17:31043	ANL/CP–76687
	17:31078	ANL/CP–76365
	17:31188	ANL–92/31
	17:31189	ANL/CP–76765
	17:31195	ANL/CP–75530
	17:31200	ANL/CP–74687
	17:31201	ANL/CP–74789
	17:31202	ANL/CP–74791
	17:31203	ANL/CP–76480
	17:31204	ANL/CP–76649
	17:31245	ANL/CP–75064
	17:31246	ANL/CP–76698
	17:31247	ANL/CP–76805
	17:31265	ANL/CP–76560
	17:31288	ANL/CP–76818
	17:31343	ANL/CP–72683
	17:31351	CONF-9205147–
	17:31445	ANL/CP–76665
	17:31470	ANL/CP–76582
	17:31471	ANL/CP–76610
	17:31473	ANL/CP–76667
	17:31539	ANL/CP–76585
	17:31540	ANL/CP–76648
	17:31541	ANL-HEP-CP–92-46
	17:31614	ANL/CP–76870
	17:31686	ANL/CP–76749
	17:32151	ANL/CP–76715
	17:32152	ANL-HEP-CP–90-98
	17:32212	ANL/CP–74960
	17:32240	ANL/CP–76821
	17:32271	ANL/CP–76673
	17:32272	ANL/CP–76820
	17:32363	ANL/CP–74717
	17:32381	ANL/CP–76653
	17:32437	ANL/FPP/TM–258
	17:32502	ANL/CP–76324
	17:32503	ANL/CP–76726
	17:32504	ANL/MCS-P–69-0389
	17:32505	ANL/TM–413-Rev.1
	17:32523	ESTSC–000277MNFRM00
	17:32537	ESTSC–000458I037000
	17:32571	ANL/CP–76315
	17:32572	ANL/CP–76725
	17:30653	ANL–92/28
	17:31310	ANL/CP–75257
	17:31472	ANL/CP–76664
	17:32185	ANL-HEP-CP–92-47
	Argonne National Lab., IL (United States). Fusion Power Program	
	17:32438	ANL/FPP/TM–260
	Argonne National Lab., IL (United States). Analytical Chemistry Lab.	
	17:31286	ANL/ACL–92/1
W-7405-ENG-26	**Oak Ridge National Lab., TN (United States)**	
	17:32524	ESTSC–000323I037000
W-7405-ENG-36	**Los Alamos Scientific Lab., NM (United States)**	
	17:30768	LA-UR–79-3216
	Los Alamos National Lab., NM (United States)	
	17:30704	LA–12272-MS
	17:30705	LA-UR–92-1920
	17:30706	LA-UR–92-2071
	17:30707	LA-UR–92-2288
	17:30708	LA-UR–92-2306
	17:30709	LA-UR–92-2331
	17:30760	LA-UR–92-2332
	17:30769	LA-UR–92-2184
	17:30770	LA-UR–92-2290
	17:30771	LA-UR–92-2327
	17:30837	LA-UR–92-2189
	17:30838	LA-UR–92-2489
	17:30844	LA-UR–92-2380
	17:30866	LA-UR–92-2391
	17:30915	LA-UR–92-2252
	17:31079	CONF-920748–14
	17:31133	LA-UR–92-2183
	17:31192	LA–12364
	17:31197	LA–12350

Contract No.	Abstract No.	Report No.
	17:31235	LA-UR–92-2400
	17:31236	LA-UR–92-2510
	17:31258	LA-UR–92-313
	17:31259	LA-UR–92-2444
	17:31273	LA-UR–92-2557
	17:31304	LA-UR–92-1978
	17:31305	LA-UR–92-2859
	17:31318	LA-UR–92-1953
	17:31360	LA-UR–92-1916
	17:31406	LA-UR–92-2464
	17:31413	LA-UR–92-1901
	17:31439	PATENTS-US–A7643315
	17:31461	LA-UR–92-2583
	17:31506	LA-UR–92-2355
	17:31507	LA-UR–92-2420
	17:31508	LA-UR–92-2422
	17:31509	LA-UR–92-2553
	17:31510	LA-UR–92-2666
	17:31511	LA-UR–92-2692
	17:31512	LA-UR–92-2703
	17:31513	LA-UR–92-2704
	17:31514	LA-UR–92-2705
	17:31515	LA-UR–92-2706
	17:31600	PATENTS-US–A7641832
	17:31630	LA-UR–92-2378
	17:31631	LA-UR–92-2388
	17:31636	LA–12348
	17:31637	LA-UR–92-1783
	17:31638	LA-UR–92-1980
	17:31661	LA-UR–92-2212
	17:31662	LA-UR–92-2425
	17:31849	LA-UR–92-2039
	17:31850	LA-UR–92-2698
	17:32041	LA-UR–92-2536
	17:32052	LA-UR–92-2125
	17:32053	LA-UR–92-2138
	17:32054	LA-UR–92-2431
	17:32055	LA-UR–92-2457
	17:32056	LA-UR–92-2495
	17:32057	LA-UR–92-2545
	17:32058	LA-UR–92-2547
	17:32059	LA-UR–92-2548
	17:32060	LA-UR–92-2603
	17:32122	LA-UR–92-2471
	17:32201	LA-UR–92-1736
	17:32202	LA-UR–92-1768
	17:32251	LA-UR–92-2268
	17:32269	LA–12343-MS
	17:32338	LA–12360-T
	17:32339	LA-UR–92-2186
	17:32340	LA-UR–92-2309
	17:32348	LA-UR–92-1805
	17:32349	LA-UR–92-1847
	17:32350	LA-UR–92-2073
	17:32361	LA-UR–92-2320
	17:32364	LA-UR–92-1993
	17:32365	LA-UR–92-2083
	17:32390	LA-UR–92-1844
	17:32391	LA-UR–92-2864
	17:32402	CONF-920419–Absts.
	17:32432	LA-UR–92-2390
	17:32464	LA-UR–92-2582
	17:32484	LA-UR–92-2158
	17:32538	ESTSC–000463C760000
	17:32555	LA–12341-M
	17:32556	LA-UR–92-1463
	17:32557	LA-UR–92-2580
	17:30772	LA-UR–92-2347
W-7405-ENG-48	**Sandia National Labs., Albuquerque, NM (United States)**	
	17:30669	DOE/NV/10576–T5
	USDOE Pittsburgh Energy Technology Center, PA (United States)	
	17:30531	CONF-9110369–
	17:30533	CONF-9110369–
	Lawrence Livermore National Lab., CA (United States)	
	17:30460	UCRL-CR–111324
	17:30486	UCRL-JC–110922-Rev.1
	17:30601	UCRL-JC–109241
	17:30602	UCRL-JC–109240
	17:30603	UCRL-JC–109386
	17:30734	UCRL-ID–111021
	17:30735	UCRL-ID–111352
	17:30736	UCRL-JC–109563
	17:30737	UCRL-JC–109653
	17:30738	UCRL-JC–109993
	17:30776	UCRL-JC–109620
	17:30777	UCRL-JC–110104
	17:30778	UCRL-JC–111078
	17:31158	UCRL-JC–108710
	17:31159	UCRL-JC–110069
	17:31194	UCRL-ID–109684
	17:31223	DOE/NBM–92001256
	17:31243	UCID–20622-92-1
	17:31244	UCRL-JC–110360
	17:31261	PATENTS-US–A7641977
	17:31263	UCRL-CR–111008
	17:31264	UCRL-JC–110481
	17:31280	UCRL-JC–108831
	17:31281	UCRL-JC–109631
	17:31282	UCRL-JC–109956
	17:31283	UCRL-JC–110324
	17:31285	UCRL–53689-91
	17:31322	UCRL-JC–108867
	17:31346	UCRL–53868-91
	17:31366	UCRL-JC–110355
	17:31402	UCRL-LR–110322
	17:31420	UCRL-JC–107973
	17:31421	UCRL-JC–108748
	17:31422	UCRL-JC–109843
	17:31423	UCRL-JC–109844
	17:31424	UCRL-JC–109845
	17:31425	UCRL-JC–110043
	17:31426	UCRL-JC–110209
	17:31601	UCRL-JC–111174
	17:31612	PATENTS-US–A7642577
	17:31629	UCRL-ID–110629
	17:31641	UCRL-JC–109645
	17:31673	UCRL-JC–107758-R1
	17:31674	UCRL-JC–108957
	17:31675	UCRL-JC–109697
	17:31676	UCRL-JC–110364
	17:31677	UCRL-JC–110377
	17:31678	UCRL-JC–110559
	17:31679	UCRL-JC–110859
	17:31746	UCRL–53779-89
	17:31768	UCRL–52000-92-4-5
	17:32064	UCRL-JC–109552
	17:32065	UCRL-MA–104861-Ver.2-3
	17:32367	UCRL-JC–110652
	17:32471	UCID–21816
	17:32472	UCRL-ID–107986
	17:32473	UCRL-JC–103286
	17:32474	UCRL-JC–108860
	17:32475	UCRL-JC–108861
	17:32476	UCRL-JC–109256
	17:32477	UCRL-JC–109555
	17:32478	UCRL-JC–110036
	17:32510	CONF-9205214–
	17:32525	ESTSC–000324SUN0000
	17:32526	ESTSC–000324SUN0001
	17:32527	ESTSC–000369MNFRM00

Contract No.	*Abstract No.*	*Report No.*
	17:32565	UCRL-JC–106562
	17:32566	UCRL-JC–110011
	17:32567	UCRL-JC–111089
	17:32479	UCRL-JC–110478
	Argonne National Lab., IL (United States). Analytical Chemistry Lab.	
	17:31287	ANL/ACL–92/2
	General Atomics, San Diego, CA (United States)	
	17:32459	GA-A–20914
W-7405-ENG-82	**Ames Lab., IA (United States)**	
	17:31231	IS-M–713
	17:31272	IS-M–714
	17:31300	IS-T–1606
	17:31404	IS–5081
	17:32014	IS-T–1553

Report Number Index

The report number index consists of the alphanumeric identifiers assigned to report literature as well as patent and conference literature cited in this publication. Entries provide the abstract number; the source(s) of availability of the document; the GPO file prefix for GPO depository library documents; the order number for OSTI and NTIS report ordering purposes; and, if the document was distributed under the DOE distribution program, the category number is shown for paper copy (PC), microfiche (MF), or no distribution (ND). These categories are included to assist DOE librarians in responding to requests for reports in their collections. The index also lists secondary numbers, with the corresponding abstract numbers and cross-references to other identifying numbers.

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
AAA-REP–					
88-2	17:31198	OSTI; NTIS		DE92562969	
88-3	17:31371	OSTI; NTIS		DE92562970	
88-4	17:31372	OSTI; NTIS		DE92562971	
89-1	17:31373	OSTI; NTIS		DE92562972	
89-2	17:31123	OSTI; NTIS		DE92562973	
89-4	17:30538	OSTI; NTIS		DE92562974	
89-5	17:31374	OSTI; NTIS		DE92562976	
90-4	17:31375	OSTI; NTIS		DE92562975	
91-1	17:31199	OSTI; NTIS		DE92562977	
91-4	17:30539	OSTI; NTIS		DE92562978	
91-5	17:31376	OSTI; NTIS		DE92562979	
91-8	17:30800	OSTI; NTIS		DE92562980	
AD/RHIC–					
110	17:31448	*See* BNL–47806			
AEA-EE–					
0147	17:31684	OSTI; NTIS (US Sales Only); INIS		DE92643802	
AGS/AD–					
92-3	17:31449	*See* BNL–47813			
92-5	17:31481	*See* BNL–47811			
92-6	17:31480	*See* BNL–47800			
92-7	17:31479	*See* BNL–47799			
ANL–					
92/28	17:30653	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019239	PC-504; PC-510
92/31	17:31188	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019300	PC-333
ANL-HEP-CP–					
90-98	17:32152	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE91004430	MF-414
92-46	17:31541	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018184	MF-414
92-47	17:32185	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018183	MF-414
ANL/ACL–					
92/1	17:31286	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019335	MF-401
92/2	17:31287	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019413	MF-401
ANL/CP–					
72683	17:31343	OSTI; NTIS; GPO Dep.	E 1.99:	DE92015190	MF-401
74685	17:30910	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019588	MF-530
74687	17:31200	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019587	MF-404
74717	17:32363	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019589	MF-405
74789	17:31201	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019585	MF-404
74791	17:31202	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019584	MF-404
74960	17:32212	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018790	MF-413
75064	17:31245	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019593	MF-404
75204	17:30901	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019590	MF-522
75257	17:31310	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018792	MF-401
75321	17:30997	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019591	MF-506
75350	17:30578	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019596	MF-902
75530	17:31195	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018794	
75688	17:30654	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019600	MF-531
76315	17:32571	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019696	MF-900
76324	17:32502	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019594	MF-405
76365	17:31078	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018788	MF-110
76480	17:31203	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019586	MF-404
76560	17:31265	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019039	MF-404
76582	17:31470	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018182	MF-411
76585	17:31539	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019041	MF-406

ANL/CP–

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
76610	17:31471	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019030	MF-413
76648	17:31540	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018185	MF-413
76649	17:31204	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019040	MF-401
76653	17:32381	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019028	MF-404
76664	17:31472	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018787	
76665	17:31445	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019027	
76667	17:31473	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019598	MF-405
76673	17:32271	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018789	MF-413
76687	17:31043	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018766	MF-331
76698	17:31246	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019597	MF-404
76715	17:32151	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019031	MF-413
76723	17:30475	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019036	MF-105
76725	17:32572	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019599	MF-405
76726	17:32503	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018769	MF-405
76749	17:31686	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018771	MF-402
76765	17:31189	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019670	MF-330
76789	17:30781	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018793	MF-404
76805	17:31247	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018795	MF-404
76818	17:31288	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018791	MF-404
76820	17:32272	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019674	MF-413
76821	17:32240	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019673	MF-413
76870	17:31614	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019671	MF-404
ANL/FPP/TM–					
258	17:32437	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040950	PC-424
260	17:32438	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041358	PC-420
ANL/MCS-P–					
69-0389	17:32504	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019334	MF-405
ANL/TM–					
413-Rev.1	17:32505	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040419	MF-405
APA–					
92019118	17:30816	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019118	MF-900
ARH–					
307-Del.	17:30650	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92040109	MF-501
309-Del.	17:30637	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92040111	MF-501
59-Del.	17:30635	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92040105	MF-501
60-Del.	17:30636	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92040106	MF-501
ASIPP–					
0014.	17:32395	*See* CNIC–00328			
0018.	17:32396	*See* CNIC–00369			
0020.	17:32398	*See* CNIC–00435			
0021.	17:32446	*See* CNIC–00464			
0022.	17:32399	*See* CNIC–00466			
0023.	17:32384	*See* CNIC–00470			
0024.	17:32385	*See* CNIC–00472			
0025.	17:32400	*See* CNIC–00475			
0026.	17:32447	*See* CNIC–00480			
AUC-IBT-R–					
9119	17:30856	OSTI; NTIS		DE92562848	
BDX–					
613-3417	17:31320	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019473	PC-701
BFR-D–					
2-92	17:31091	OSTI; NTIS		DE92563093	
5-92	17:31092	OSTI; NTIS		DE92563094	
7-92	17:31093	OSTI; NTIS		DE92563064	
BFR-R–					
13-92	17:31094	OSTI; NTIS		DE92563065	
BFR-T–					
18-92	17:31145	OSTI; NTIS		DE92563095	
BIHEP–					
0015.	17:32241	*See* CNIC–00371			
0016.	17:32130	*See* CNIC–00463			
BINE–					
0009.	17:31349	*See* CNIC–00388			
0010.	17:31350	*See* CNIC–00397			
0011.	17:32507	*See* CNIC–00403			
0013.	17:30784	*See* CNIC–00424			
0015.	17:30924	*See* CNIC–00549			
BNIF–					
0003.	17:31545	*See* CNIC–00422			
0005.	17:31644	*See* CNIC–00496			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
BNL–					
45080	17:30765	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019497	MF-900
45848	17:32152	*See* ANL-HEP-CP–90-98			
47088	17:31196	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019412	MF-700
47103	17:31474	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019499	MF-414
47104	17:31475	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019500	MF-414
47119	17:31476	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019498	MF-414
47142	17:31427	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019367	MF-413
47148	17:31477	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019451	MF-414
47149	17:31478	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019452	MF-414
47156	17:30853	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019368	MF-403
47266	17:31446	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019221	MF-414
47267	17:31447	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019251	MF-414
47624	17:31687	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019411	MF-402; MF-408
47764	17:32273	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019236	MF-413
47765	17:32274	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019219	MF-413
47769	17:30998	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019254	MF-523
47776	17:31542	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019255	MF-414
47784	17:31428	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019247	MF-414
47785	17:31429	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019259	MF-414
47786	17:30999	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019238	MF-523
47796	17:31248	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019249	MF-404
47799	17:31479	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019253	MF-414
47800	17:31480	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019246	MF-414
47803	17:31529	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019248	MF-414
47806	17:31448	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019256	MF-414
47811	17:31481	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019220	MF-414
47813	17:31449	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019217	MF-414
47814	17:32360	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019257	MF-411
47832	17:31059	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019008	MF-350
BNL-NUREG–					
47342	17:31000	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018164	
47747	17:30911	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018144	
47766	17:31001	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019234	
47768	17:31002	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019250	MF-522
47809	17:31003	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019258	
47818	17:31004	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019218	
BNWL-CC–					
224-Add.	17:30969	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019153	MF-500
BSPHN–					
0004.	17:30964	*See* CNIC–00544			
CAP–					
85-92R	17:31529	*See* BNL–47803			
CCC–					
454	17:32546	*See* ESTSC/NRC–000360C660000			
454	17:32547	*See* ESTSC/NRC–000360IPS0200			
CCMS–					
92-14	17:31260	*See* ORNL/Sub–87-SA946/02			
CEA-CONF–					
10490	17:32375	OSTI; NTIS (US Sales Only); INIS		DE92566719	
10837	17:32153	OSTI; NTIS (US Sales Only); INIS		DE92566698	
10838	17:31205	OSTI; NTIS (US Sales Only); INIS		DE92566720	
10839	17:32154	OSTI; NTIS (US Sales Only); INIS		DE92566699	
10840	17:31289	OSTI; NTIS (US Sales Only); INIS		DE92566701	
10841	17:32070	OSTI; NTIS (US Sales Only); INIS		DE92566702	
10842	17:31769	OSTI; NTIS (US Sales Only); INIS		DE92566703	
10843	17:31347	OSTI; NTIS (US Sales Only); INIS		DE92566721	
10845	17:32203	OSTI; NTIS (US Sales Only); INIS		DE92566704	
10846	17:32186	OSTI; NTIS (US Sales Only); INIS		DE92566705	
10847	17:31770	OSTI; NTIS (US Sales Only); INIS		DE92566706	
10848	17:32368	OSTI; NTIS (US Sales Only); INIS		DE92566621	
10849	17:32369	OSTI; NTIS (US Sales Only); INIS		DE92566622	
10850	17:32275	OSTI; NTIS (US Sales Only); INIS		DE92566700	
10852	17:31249	OSTI; NTIS (US Sales Only); INIS		DE92566722	
10853	17:30655	OSTI; NTIS (US Sales Only); INIS		DE92566723	
10854	17:30656	OSTI; NTIS (US Sales Only); INIS		DE92566724	
10855	17:31771	OSTI; NTIS (US Sales Only); INIS		DE92566707	
10856	17:32394	OSTI; NTIS (US Sales Only); INIS		DE92566725	
10857	17:32439	OSTI; NTIS (US Sales Only); INIS		DE92566726	
10858	17:30657	OSTI; NTIS (US Sales Only); INIS		DE92566727	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
10884	17:31250	OSTI; NTIS (US Sales Only); INIS		DE93701048	
10891	17:32018	OSTI; NTIS (US Sales Only); INIS		DE92566624	
10892	17:31251	OSTI; NTIS (US Sales Only); INIS		DE92566625	
10938	17:32440	OSTI; NTIS (US Sales Only); INIS		DE93701263	
10939	17:32441	OSTI; NTIS (US Sales Only); INIS		DE93701261	
10940	17:32370	OSTI; NTIS (US Sales Only); INIS		DE93701259	
10941	17:31348	OSTI; NTIS (US Sales Only); INIS		DE93701257	
10943	17:31206	OSTI; NTIS (US Sales Only); INIS		DE92566631	
10944	17:31207	OSTI; NTIS (US Sales Only); INIS		DE92566630	
10945	17:31208	OSTI; NTIS (US Sales Only); INIS		DE92566629	
10946	17:32442	OSTI; NTIS (US Sales Only); INIS		DE93701251	
10947	17:32443	OSTI; NTIS (US Sales Only); INIS		DE93701253	
10948	17:32444	OSTI; NTIS (US Sales Only); INIS		DE93701255	
10969	17:31209	OSTI; NTIS (US Sales Only); INIS		DE93701049	
10972	17:32019	OSTI; NTIS (US Sales Only); INIS		DE93701213	
10975	17:30658	OSTI; NTIS (US Sales Only); INIS		DE93701093	
CEA-LNS-GT–					
91-08	17:31450	OSTI; NTIS (US Sales Only); INIS		DE93701142	
92-01	17:31451	OSTI; NTIS (US Sales Only); INIS		DE93701201	
92-04	17:31452	OSTI; NTIS (US Sales Only); INIS		DE93701203	
CEA-LNS-Ph–					
92-14	17:32187	OSTI; NTIS (US Sales Only); INIS		DE93701205	
CEA-N–					
2680	17:32129	OSTI; NTIS (US Sales Only); INIS		DE93701123	
CEA-R–					
5569	17:30633	OSTI; NTIS (US Sales Only); INIS		DE92566737	
5576	17:31210	OSTI; NTIS (US Sales Only); INIS		DE92566619	
5578	17:31290	OSTI; NTIS (US Sales Only); INIS		DE92566738	
5581	17:31211	OSTI; NTIS (US Sales Only); INIS		DE92566620	
5582	17:31291	OSTI; NTIS (US Sales Only); INIS		DE92566739	
CEAC-R–					
2-91	17:31252	OSTI; NTIS (US Sales Only); INIS		DE93601382	
2-92	17:32342	OSTI; NTIS (US Sales Only); INIS		DE93602910	
3-92	17:32343	OSTI; NTIS (US Sales Only); INIS		DE93602903	
4-91	17:31688	OSTI; NTIS (US Sales Only); INIS		DE93601475	
4-92	17:30782	OSTI; NTIS (US Sales Only); INIS		DE93601966	
5-91	17:31543	OSTI; NTIS (US Sales Only); INIS		DE93602304	
5-92	17:30939	OSTI; NTIS (US Sales Only); INIS		DE93602041	
CESAR–					
92/11A	17:32511	*See* CONF-9206152–1			
CFFTP-G–					
9127	17:32445	OSTI; NTIS (US Sales Only); INIS		DE93603008	
CMI-R–					
90/A30005	17:30575	OSTI; NTIS; INIS		DE92562991	
CNDC–					
0005	17:32204	*See* CNIC–00492			
CNIC–					
00328	17:32395	OSTI; NTIS (US Sales Only); INIS		DE93602961	
00331	17:30880	OSTI; NTIS (US Sales Only); INIS		DE93602092	
00337	17:31605	OSTI; NTIS (US Sales Only); INIS		DE93602310	
00340	17:30881	OSTI; NTIS (US Sales Only); INIS		DE93602093	
00341	17:31606	OSTI; NTIS (US Sales Only); INIS		DE93602311	
00342	17:32506	OSTI; NTIS (US Sales Only); INIS		DE93602457	
00343	17:30882	OSTI; NTIS (US Sales Only); INIS		DE93602094	
00344	17:30634	OSTI; NTIS (US Sales Only); INIS		DE93601310	
00346	17:30954	OSTI; NTIS (US Sales Only); INIS		DE93602057	
00347	17:30883	OSTI; NTIS (US Sales Only); INIS		DE93602096	
00362	17:30884	OSTI; NTIS (US Sales Only); INIS		DE93602097	
00363	17:30970	OSTI; NTIS (US Sales Only); INIS		DE93602138	
00365	17:30885	OSTI; NTIS (US Sales Only); INIS		DE93602098	
00367	17:32371	OSTI; NTIS (US Sales Only); INIS		DE93603032	
00369	17:32396	OSTI; NTIS (US Sales Only); INIS		DE93602951	
00371	17:32241	OSTI; NTIS (US Sales Only); INIS		DE93602758	
00373	17:31482	OSTI; NTIS (US Sales Only); INIS		DE93602023	
00374	17:31483	OSTI; NTIS (US Sales Only); INIS		DE93602024	
00376	17:31602	OSTI; NTIS (US Sales Only); INIS		DE93602322	
00381	17:32397	OSTI; NTIS (US Sales Only); INIS		DE93602944	
00385	17:31544	OSTI; NTIS (US Sales Only); INIS		DE93602173	
00387	17:31266	OSTI; NTIS (US Sales Only); INIS		DE93601399	
00388	17:31349	OSTI; NTIS (US Sales Only); INIS		DE93602006	
00389	17:31689	OSTI; NTIS (US Sales Only); INIS		DE93601408	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
00394	17:30783	OSTI; NTIS (US Sales Only); INIS		DE93601977	
00396	17:30638	OSTI; NTIS (US Sales Only); INIS		DE93601314	
00397	17:31350	OSTI; NTIS (US Sales Only); INIS		DE93602007	
00400	17:32048	OSTI; NTIS (US Sales Only); INIS		DE93602496	
00401	17:31191	OSTI; NTIS (US Sales Only); INIS		DE93602444	
00403	17:32507	OSTI; NTIS (US Sales Only); INIS		DE93602458	
00406	17:31377	OSTI; NTIS (US Sales Only); INIS		DE93601995	
00411	17:31212	OSTI; NTIS (US Sales Only); INIS		DE93601350	
00416	17:31378	OSTI; NTIS (US Sales Only); INIS		DE93601996	
00420	17:30951	OSTI; NTIS (US Sales Only); INIS		DE93602048	
00422	17:31545	OSTI; NTIS (US Sales Only); INIS		DE93602151	
00424	17:30784	OSTI; NTIS (US Sales Only); INIS		DE93601967	
00435	17:32398	OSTI; NTIS (US Sales Only); INIS		DE93602962	
00443	17:31292	OSTI; NTIS (US Sales Only); INIS		DE93601184	
00444	17:30952	OSTI; NTIS (US Sales Only); INIS		DE93602049	
00445	17:31854	OSTI; NTIS (US Sales Only); INIS		DE93601718	
00446	17:32383	OSTI; NTIS (US Sales Only); INIS		DE93603071	
00448	17:31411	OSTI; NTIS (US Sales Only); INIS		DE93602312	
00454	17:31867	OSTI; NTIS (US Sales Only); INIS		DE93601637	
00455	17:30955	OSTI; NTIS (US Sales Only); INIS		DE93602058	
00456	17:31855	OSTI; NTIS (US Sales Only); INIS		DE93601651	
00458	17:31868	OSTI; NTIS (US Sales Only); INIS		DE93601565	
00459	17:31856	OSTI; NTIS (US Sales Only); INIS		DE93601696	
00460	17:32508	OSTI; NTIS (US Sales Only); INIS		DE93602460	
00461	17:31869	OSTI; NTIS (US Sales Only); INIS		DE93601638	
00462	17:31870	OSTI; NTIS (US Sales Only); INIS		DE93601639	
00463	17:32130	OSTI; NTIS (US Sales Only); INIS		DE93602581	
00464	17:32446	OSTI; NTIS (US Sales Only); INIS		DE93603005	
00465	17:31546	OSTI; NTIS (US Sales Only); INIS		DE93602223	
00466	17:32399	OSTI; NTIS (US Sales Only); INIS		DE93602963	
00467	17:31857	OSTI; NTIS (US Sales Only); INIS		DE93601719	
00468	17:31607	OSTI; NTIS (US Sales Only); INIS		DE93602313	
00469	17:31871	OSTI; NTIS (US Sales Only); INIS		DE93601566	
00470	17:32384	OSTI; NTIS (US Sales Only); INIS		DE93603072	
00471	17:31329	OSTI; NTIS (US Sales Only); INIS		DE93601273	
00472	17:32385	OSTI; NTIS (US Sales Only); INIS		DE93603073	
00474	17:31872	OSTI; NTIS (US Sales Only); INIS		DE93601567	
00475	17:32400	OSTI; NTIS (US Sales Only); INIS		DE93602964	
00477	17:30785	OSTI; NTIS (US Sales Only); INIS		DE93601978	
00478	17:30971	OSTI; NTIS (US Sales Only); INIS		DE93602139	
00479	17:30886	OSTI; NTIS (US Sales Only); INIS		DE93602100	
00480	17:32447	OSTI; NTIS (US Sales Only); INIS		DE93602996	
00482	17:31379	OSTI; NTIS (US Sales Only); INIS		DE93601997	
00483	17:31873	OSTI; NTIS (US Sales Only); INIS		DE93601568	
00484	17:31690	OSTI; NTIS (US Sales Only); INIS		DE93601409	
00485	17:31874	OSTI; NTIS (US Sales Only); INIS		DE93601569	
00487	17:31380	OSTI; NTIS (US Sales Only); INIS		DE93601998	
00488	17:30918	OSTI; NTIS (US Sales Only); INIS		DE93602436	
00489	17:31381	OSTI; NTIS (US Sales Only); INIS		DE93601999	
00490	17:31875	OSTI; NTIS (US Sales Only); INIS		DE93601640	
00492	17:32204	OSTI; NTIS (US Sales Only); INIS		DE93602695	
00493	17:32401	OSTI; NTIS (US Sales Only); INIS		DE93602948	
00496	17:31644	OSTI; NTIS (US Sales Only); INIS		DE93601521	
00497	17:31876	OSTI; NTIS (US Sales Only); INIS		DE93601641	
00499	17:31877	OSTI; NTIS (US Sales Only); INIS		DE93601642	
00503	17:30887	OSTI; NTIS (US Sales Only); INIS		DE93602101	
00504	17:31267	OSTI; NTIS (US Sales Only); INIS		DE93601397	
00505	17:30786	OSTI; NTIS (US Sales Only); INIS		DE93601968	
00509	17:30639	OSTI; NTIS (US Sales Only); INIS		DE93601315	
00512	17:30888	OSTI; NTIS (US Sales Only); INIS		DE93602102	
00515	17:32386	OSTI; NTIS (US Sales Only); INIS		DE93603142	
00516	17:30922	OSTI; NTIS (US Sales Only); INIS		DE93602375	
00517	17:30923	OSTI; NTIS (US Sales Only); INIS		DE93602376	
00518	17:31858	OSTI; NTIS (US Sales Only); INIS		DE93601720	
00520	17:31859	OSTI; NTIS (US Sales Only); INIS		DE93601652	
00523	17:30787	OSTI; NTIS (US Sales Only); INIS		DE93601969	
00529	17:30788	OSTI; NTIS (US Sales Only); INIS		DE93601992	
00539	17:31213	OSTI; NTIS (US Sales Only); INIS		DE93601327	
00540	17:30972	OSTI; NTIS (US Sales Only); INIS		DE93602140	
00541	17:30889	OSTI; NTIS (US Sales Only); INIS		DE93602103	
00542	17:31214	OSTI; NTIS (US Sales Only); INIS		DE93601363	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
00544	17:30964	OSTI; NTIS (US Sales Only); INIS		DE93601736	
00545	17:30890	OSTI; NTIS (US Sales Only); INIS		DE93602104	
00549	17:30924	OSTI; NTIS (US Sales Only); INIS		DE93602366	
CNPE/HCT–					
2	17:31284	*See* Y/EN–4325			
9	17:31368	*See* Y/EN–4452			
14/R2	17:31370	*See* Y/EN–4671/R2			
CONF-791117–		(ANS topical conference; Charleston, SC (United States); 26-19 Nov 1979)			
29	17:30768	*See* LA-UR–79-3216			
CONF-8410501–		(International conference on occupational radiation safety in mining; Toronto (Canada); 14-18 Oct 1984)			
	17:30608	*See* INIS-mf–13347			
CONF-8704408–		(Symposium of the Finnish research project on acidification (HAPRO); Helsinki (Finland); 21-24 Apr 1987)			
	17:31683	*See* YMP-A–64/1987			
CONF-8804245–		(8. International workshop on Photon-Photon Collisions; Jerusalem (Israel); 24-28 Apr 1988)			
3	17:32181	*See* SLAC-PUB–4596			
CONF-8808145–		(4. meeting of the Division of Particles and Fields of the American Physical Society (APS); Storrs, CT (United States); 15-18 Aug 1988)			
35	17:32182	*See* SLAC-PUB–4830			
CONF-8809537–		(National conference on corrosion problems of materials for mechanical, power and chemical engineering; Nitra (Czechoslovakia); 27 Sep 1988)			
	17:31230	*See* INIS-mf–13351			
CONF-8904438–		(1989 Israel Geological Society annual meeting; Ramot (Israel); 2-5 Apr 1989)			
	17:32013	*See* INIS-mf–13333			
CONF-8905122–		(13. actinide separations conference; Idaho Falls, ID (United States); May 1989)			
10	17:31308	*See* WINCO–11509			
CONF-8906324–		(International workshop on the Rietveld method; Petten (Netherlands); 13-15 Jun 1989)			
2	17:31288	*See* ANL/CP–76818			
CONF-890903–		(International europhysics conference on high-energy physics; Madrid (Spain); 6-14 Sep 1989)			
1	17:32183	*See* SLAC-PUB–5100			
CONF-8910575–		(Patterns in the universe: an international symposium; Washington, DC (United States); 20-22 Oct 1989)			
1	17:32042	*See* LBL–27862			
CONF-891113–		(American Institute of Chemical Engineers (AIChE) annual meeting; San Francisco, CA (United States); 5-10 Nov 1989)			
14	17:30741	*See* WINCO–11562			
CONF-9003264–		(4. Annecy meeting on theoretical physics: recent advanced in field theory; Annecy-le-Vieux (France); 5-9 Mar 1990)			
	17:32113	*See* LAPP-TH–292/90			
CONF-9004359–		(Symposium dedicated to factual problem in radiation safety; Hertzlia (Israel); 25 Apr 1990)			
	17:31924	*See* INIS-mf–13215			
CONF-9006257–		(1990 DPF summer study on high energy physics; Snowmass, CO (United States); 25 Jun - 13 jul 1990)			
9	17:32152	*See* ANL-HEP-CP–90-98			
CONF-9006421–		(Workshop on DNA Repair on Mutagenesis Induced by Radiation; Dubna (USSR); 12-14 Jun 1990)			
	17:31959	*See* JINR-D–19-90-457			
CONF-900726–		(7. international conference on polarization phenomena in nuclear physics; Paris (France); 4-13 Jul 1990)			
	17:32259	*See* IPNO–1990/1			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-900777–		(Workshop on science at the KAON factory; Vancouver (Canada); 23-28 Jul 1990)			
	17:32164	*See* ISN–90-59			
CONF-9008247–		(2. Latin American congress of biotechnology; Havana (Cuba); 7-11 Aug 1990)			
	17:31853	*See* IPEN-PUB–361			
CONF-9009508–		(Joint meeting of the Division of Development and Technology Plasma Wall Interaction and High Heat Flux Materials and Components task groups; Albuquerque, NM (United States); 12-14 Sep 1990)			
	17:32469	*See* SAND–91-0284			
CONF-9010497–		(Technical workshop on near field performance assessment for high-level waste; Madrid (Spain); 15-17 Oct 1990)			
	17:30723	*See* SKB-TR–91-59			
CONF-9010505–		(Final research co-ordination meeting on regional network for Latin America on animal disease diagnosis using immunoassay and labelled DNA probe techniques; Heredia (Costa Rica); 22-26 Oct 1990)			
	17:31860	*See* IAEA-TECDOC–657			
CONF-9010510–		(1. International triangle workshop CERN-IHEP-JINR; Dubna (USSR); 1-5 Oct 1990)			
	17:32198	*See* LAPP-TH–322/90			
CONF-901107–		(9. American Society for Testing and Materials (ASTM) international symposium on zirconium in the nuclear industry; Kobe (Japan); 5-8 Nov 1990)			
	17:31205	*See* CEA-CONF–10838			
CONF-9012153–		(RCNP cascade project workshop 'heavy ion secondary beam course'; RCNP cascade project workshop 'heavy ion secondary beam course'; Ibaraki (Japan); IBARAKI (is not a valid Country Code.); 15 Dec 1990; 26 jan 1991)			
	17:31521	*See* RCNP-T–29			
CONF-910111–		(29. international winter meeting on nuclear physics; Bormio (Italy); 14-25 Jan 1991)			
	17:32268	*See* ISN–91-05			
	17:32319	*See* ISN–91-20			
CONF-9101148–		(RCNP cascade project workshop 'heavy ion secondary beam course'; RCNP cascade project workshop 'heavy ion secondary beam course'; Ibaraki (Japan); IBARAKI (is not a valid Country Code.); 15 Dec 1990; 26 jan 1991)			
	17:31521	*See* RCNP-T–29			
CONF-910135–		(7. winter workshop on nuclear dynamics; Key West, FL (United States); 27 Jan - 2 feb 1991)			
	17:32232	*See* ISN–91-28			
CONF-9103110–		(Advanced solid-state lasers topical meeting; Hilton Head, SC (United States); 18-20 Mar 1991)			
	17:31250	*See* CEA-CONF–10884			
CONF-9103253–		(1991 atmospheric model working meeting; Richland, WA (United States); 25-26 Mar 1991)			
Summ.	17:31999	*See* PNWD–1975-HEDR			
CONF-9103255–		(Symposium on Numerical Probabilities; Marseille (France); 18-22 Mar 1991)			
	17:32018	*See* CEA-CONF–10891			
CONF-9103256–		(4. World Conference on Inflammation; Geneve (Switzerland); 15 Mar 1991)			
	17:31769	*See* CEA-CONF–10842			
CONF-910396–		(1. European biennial workshop on nuclear physics; Megeve (France); 25-29 Mar 1991)			
	17:31433	*See* IPNO-DRE–91/11			
CONF-9104381–		(1991 Israel Geological Society annual meeting; Akko (Israel); 22-25 Apr 1991)			
	17:32012	*See* INIS-mf–13331			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9104387–		(4. international school of nondestructive testing; Vysoke Tatry (Czechoslovakia); 22-25 Apr 1991)			
	17:31403	*See* INIS-mf–13350			
CONF-9104388–		(3. International Symposium on the Fabrication and Properties of Lithium Ceramics' during the '93. Annual Meeting of the American Ceramic Society'; Cincinnati OH (United States); 28 Apr - 2 may 1991)			
	17:32452	*See* ECN-RX–91-067			
CONF-910503–		(International conference on nuclear data for science and technology; Juelich (Germany); 13-17 May 1991)			
	17:30940	*See* ECN-RX–91-049			
	17:32216	*See* ECN-RX–91-050			
	17:32217	*See* ECN-RX–91-054			
	17:32282	*See* ECN-RX–91-046			
	17:32283	*See* ECN-RX–91-051			
	17:32284	*See* ECN-RX–91-061			
CONF-910505–		(1991 Institute of Electrical and Electronics Engineers (IEEE) particle accelerator conference (PAC); San Francisco, CA (United States); 6-11 May 1991)			
	17:31432	*See* GANIL-A–91-03			
	17:31453	*See* GANIL-A–91-04			
CONF-9105126–		(14. U.S. Department of Energy (DOE) computer security group conference; Concord, CA (United States); 7-9 May 1991)			
7	17:32509	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019011	MF-900
CONF-9105162–		(14. combustion research meeting; Department of Energy-Basic Energy Sciences (DOE-BES) combustion research meeting; Tahoe City, CA (United States); Lake Geneva, WI (United States); 14-17 Jun 1992; 28-31 may 1991)			
1	17:31343	*See* ANL/CP–72683			
CONF-9105257–		(Workshop on meson production, interaction and decay; Krakow (Poland); 6-11 May 1991)			
	17:32162	*See* IPNO-DRE–91-22			
CONF-9105353–		(5. Pisa symposium on advanced detectors; Elba (Italy); 26-31 May 1991)			
	17:31584	*See* LAPP-EXP–91-05			
CONF-9105372–		(Topological and geometrical methods in field theory; Turku (Finland); 26 May - 1 jun 1991)			
	17:32120	*See* LAPP-TH–342/91			
CONF-9105380–		(International AMSE Conference Neural Networks; San Diego CA (United States); 29-31 May 1991)			
	17:30959	*See* ECN-RX–91-044			
CONF-910580–		(ICAM '91: international conference on advanced materials; Strasbourg (France); 27-31 May 1991)			
	17:31251	*See* CEA-CONF–10892			
CONF-9106107–		(International conference on new nuclear physics with advanced techniques; Ierapetra (Greece); 23-29 Jun 1991)			
	17:32228	*See* IPNO-DRE–91-23			
CONF-9106158–		(NIKKO'91: towards a unified picture of nuclear dynamics; Nikko (Japan); 6-14 Jun 1991)			
	17:32279	*See* CRN-PN–91-18			
1	17:32276	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE91011375	MF-413
CONF-9106248–		(Department of Energy national underground storage tank waste characterization needs assessment workshop; Hanford, WA (United States); 25-27 Jun 1991)			
	17:30740	*See* WHC-EP–0514			
CONF-9106297–		(6. Marcel Grossmann meeting on general relativity; Kyoto (Japan); 23-29 Jun 1991)			
	17:31585	*See* LAPP-EXP–91-07			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9106310–		(2. international symposium on fusion nuclear technology and exposition; Karlsruhe (Germany); 2-7 Jun 1991)			
	17:32440	*See* CEA-CONF–10938			
	17:32445	*See* CFFTP-G–9127			
CONF-9106336–		(6. international conference on nuclear reactions mechanisms; Varenne (Italy); 10-15 Jun 1991)			
	17:32316	*See* IPNO-DRE–91-20			
CONF-9106357–		(International Conference on Industrial Engineering Applications of Artificial Intelligence and Expert Systems; Hawaii, HI (United States); 2-5 Jun 1991)			
	17:31347	*See* CEA-CONF–10843			
CONF-9106389–		(International workshop on investigation of deuteron structure at high energy physics; Dubna (USSR); 11-13 Jun 1991)			
	17:32315	*See* IPNO-DRE–91-18			
CONF-9106390–		(4. International conference on mathematical and computational chemistry; Bled (Yugoslavia); 3-7 Jun 1991)			
	17:32043	*See* LYCEN–91-21			
CONF-9106391–		(Intermediate meeting of EE500 working groups; Annecy (France); 10-11 Jun 1991)			
	17:32171	*See* LAL–91-62			
CONF-910646–		(6. conference on radiation effects in insulators; Weimar (Germany); 24-28 Jun 1991)			
	17:31271	*See* ECN-RX–91-069			
CONF-9107160–		(13. international colloquium on dynamics of explosives and reactive systems; Nagoya (Japan); 28 Jul - 31 aug 1991)			
3	17:31158	*See* UCRL-JC–108710			
CONF-9107172–		(15. joint international lepton photon symposium at high energies and European Physical Society (EPS) conference on high energy; Geneva (Switzerland); 25 Jul - 1 aug 1991)			
	17:32170	*See* LAL–91-49			
	17:32197	*See* LAL–91-48			
CONF-9107232–		(NATO advanced study institute program on the behavior of systems in the space environment; Pitlochry (United Kingdom); 6-21 Jul 1991)			
1	17:31463	*See* SAND–91-1492C			
CONF-9107233–		(33. Rocky Mountain conference on analytical chemistry; Denver, CO (United States); 28 Jul - 1 aug 1991)			
1	17:31309	*See* WINCO–11722			
CONF-9107235–		(SNOWMASS meeting; Denver, CO (United States); 21 Jul - 10 aug 1991)			
1-Rev.1	17:30486	*See* UCRL-JC–110922-Rev.1			
CONF-9107236–		(4. Symposium on Nuclear Physics High Density and High Temperature Physics; Namwon (Korea, Republic of); 1-5 Jul 1991)			
	17:32070	*See* CEA-CONF–10841			
CONF-910730–		(4. international conference on synchrotron radiation instrumentation; Chester (United Kingdom); 15-19 Jul 1991)			
32	17:31516	*See* LBL–31041			
CONF-910771–		(13. IMACS world congress on computation and applied mathematics; Dublin (Ireland); 22-26 Jul 1991)			
5	17:32565	*See* UCRL-JC–106562			
CONF-9108199–		(Latin American school of physics; Caxambu (Brazil); 4-24 Aug 1991)			
	17:32378	*See* IPNO-DRE–91-19			
CONF-9108212–		(Symposium on nuclear physics; Tours (France); 29-31 Aug 1991)			
	17:32132	*See* GANIL-P–91-17			
CONF-9108215–		(Hadron 91 Congress; College Park, MD (United States); 12-16 Aug 1991)			
	17:32154	*See* CEA-CONF–10839			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9108216–		(Advances in nuclear synthesis; Pasadena, CA (United States); 12-15 Aug 1991)			
1	17:32060	*See* LA-UR–92-2603			
CONF-9109114–		(6. symposium on containment of underground nuclear explosions; Reno, NV (United States); 24-26 Sep 1991)			
12	17:31641	*See* UCRL-JC–109645			
CONF-9109127–		(Workshop on baryon spectroscopy and the structure of the nucleon; Saclay (France); 23-25 Sep 1991)			
	17:32203	*See* CEA-CONF–10845			
CONF-9109291–		(5. mesons and light nuclei; Prague (Czechoslovakia); 1-6 Sep 1991)			
	17:32186	*See* CEA-CONF–10846			
CONF-9109342–		(Conference on the research and studies group on signal processing; Juan-les-pins (France); 16 Sep 1991)			
	17:31770	*See* CEA-CONF–10847			
CONF-9109374–		(Workshop on physics and experiments with linear colliders; Saariselkae (Finland); Sep 1991)			
	17:32172	*See* LAL–91-63			
CONF-9109391–		(2. international workshop on chromosome 22: progress and strategies; Montreal (Canada); 10-13 Sep 1991)			
Summ.	17:31767	*See* DOE/ER/61242–2			
CONF-9109419–		(9. International Conference on Positron Annihilation; Budapest (Hungary); 26-30 Sep 1991)			
	17:32368	*See* CEA-CONF–10848			
	17:32369	*See* CEA-CONF–10849			
CONF-9109420–		(4. International Meeting on the Ion Sources; Darmstadt (Germany); 30 Sep - 4 oct 1991)			
	17:32275	*See* CEA-CONF–10850			
CONF-9109421–		(5. European Conference on Sensors V; Rome (Italy); 30 Sep - 2 oct 1991)			
	17:31289	*See* CEA-CONF–10840			
CONF-9109422–		(ICFA workshop; Hamburg (Germany); Sep 1991)			
	17:32147	*See* LAL–91-61			
CONF-9109424–		(1991 Gif Summer School; Palaiseau (France); Sep 1991)			
	17:32173	*See* LAL–92-06			
	17:32174	*See* LAL–92-07			
CONF-910993–		(International conference on nuclear criticality (ICNC) safety; Oxford (United Kingdom); 9-13 Sep 1991)			
	17:32517	*See* ECN-RX–91-063			
CONF-9110225–		(1991 symposium on the Superconducting Super Collider (SSC); Corpus Christi, TX (United States); 13-17 Oct 1991)			
	17:31444	*See* SSCL-SR–1213			
CONF-9110231–		(Topical conference on nuclear data for fusion reactor technology; Karlsruhe (Germany); 23 Oct 1991)			
	17:32453	*See* ECN-RX–91-102			
CONF-9110236–		(Working group 3 Joint Coordinating Committee on Nuclear Reactor Safety (JCCNRS) meeting; Oak Ridge, TN (United States); 16-18 Oct 1991)			
8	17:32242	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019755	MF-413
CONF-9110318–		(SuperLEAR workshop; Zurich (Switzerland); 9-12 Oct 1991)			
	17:32176	*See* LAPP-EXP–91-09			
CONF-9110326–		(European conference on laser interaction with matter (ECLIM); Warsaw (Poland); 21-25 Oct 1991)			
	17:32439	*See* CEA-CONF–10857			
CONF-9110373–		(Specialists' meeting on high energy nuclear data; Tokai (Japan); 3-4 Oct 1991)			
	17:32211	*See* JAERI-M–92-039			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9110402–		(Conference on constructed wetlands for water quality improvement; Pensacola, FL (United States); 21-24 Oct 1991)			
1	17:31691	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018250	MF-403
CONF-9110404–		(IMA workshop on sparse matrix computations: graph theory issues and algorithms; Minneapolis, MN (United States); 14-18 Oct 1991)			
1	17:32503	*See* ANL/CP–76726			
CONF-9110405–		(4. Brazilian meeting on biological control of plant diseases; Campinas (Brazil); 8 Oct 1991)			
	17:31864	*See* INIS-BR–2924			
CONF-9110410–		(3. International Land Fill Symposium; Cagliari (Italy); 14-18 Oct 1991)			
	17:30655	*See* CEA-CONF–10853			
	17:30656	*See* CEA-CONF–10854			
CONF-9110414–		(NEACRP Specialist Meeting on In-core Instrumentation and Reactor Core Assessment; Pittsburgh PA (United States); 1-4 Oct 1991)			
	17:30961	*See* ECN-RX–91-110			
CONF-911061–		(3. international autumn meeting on modern aspects of superconductivity; Paris (France); 7-10 Oct 1991)			
	17:31249	*See* CEA-CONF–10852			
CONF-911079–		(19. Nuclear Regulatory Commission (NRC) water reactor safety information meeting; Bethesda, MD (United States); 28-30 Oct 1991)			
32	17:31008	*See* EGG-M–91413			
33	17:31009	*See* EGG-M–91432			
CONF-911111–		(International conference on fusion reactor materials; Clearwater, FL (United States); 17-22 Nov 1991)			
	17:30657	*See* CEA-CONF–10858			
	17:32441	*See* CEA-CONF–10939			
CONF-9111127–		(33. annual Division of Plasma Physics/American Physical Society (DPP/APS) meeting; Tampa, FL (United States); 4-8 Nov 1991)			
	17:32394	*See* CEA-CONF–10856			
	17:32422	*See* EUR-CEA-FC–1442			
CONF-9111203–		(International conference CUM workshop on current trends in data acquisition and control of accelerators; Calcutta (India); 19-21 Nov 1991)			
	17:31431	*See* GANIL-A–91-02			
CONF-9111211–		(1991 Japan Atomic Energy Research Institute (JAERI) symposium on nuclear data; Tokai (Japan); 28-29 Nov 1991)			
	17:32210	*See* JAERI-M–92-027			
CONF-9111214–		(The 12th Study Meeting of hydrogen Energy System; Tokyo (Japan); 20 Nov 1991)			
	17:30794	OSTI; NTIS; Available from Hydrogen Energy Systems Society of Japan, Setagaya Tokyo (Japan)		DE93000802	
CONF-9111256–		(Conference on Advances in Quantitation and Imaging Methods; Liege (Belgium); 8-9 Nov 1991)			
	17:31771	*See* CEA-CONF–10855			
CONF-9111258–		(13. Werner Brandt Workshop on the Interaction of Charged Particles with Matter; Nara (Japan); 9-17 Nov 1991)			
	17:32375	*See* CEA-CONF–10490			
CONF-9111260–		(I.A.E.A. Technical Committee Meeting on Negative Ion Based Neutral Beam Injector; Naka (Japan); 11-13 Nov 1991)			
	17:32442	*See* CEA-CONF–10946			
	17:32443	*See* CEA-CONF–10947			
	17:32444	*See* CEA-CONF–10948			
CONF-911154–		(International conference on evolution in beam applications; Takasaki (Japan); 5-8 Nov 1991)			
	17:30789	*See* INIS-JP–007			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-911208–		(International symposium on hypernuclear and strange particle physics; Shimoda (Japan); 9-12 Dec 1991)			
	17:32153	*See* CEA-CONF–10837			
CONF-9112129–		(International Society for Mini and Microcomputers (ISMM) international symposium on mini and microcomputers; Long Beach, CA (United States); 11-13 Dec 1991)			
1	17:31076	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019021	MF-112
CONF-9112131–		(3. international seminar on natural gas; Sao Paulo (Brazil); 4-6 Dec 1991)			
	17:30595	*See* INIS-BR–2931			
CONF-911281–		(Workshop on surface processing; Dearborn, MI (United States); 10-12 Dec 1991)			
2	17:31143	*See* SAND–92-1518C			
CONF-9201105–		(Advanced photon source reliability workshop; Argonne, IL (United States); 29-31 Jan 1992)			
1	17:31442	*See* SLAC-PUB–5875			
CONF-9201110–		(Workshop on the use of PRA methodology for the analysis of reactor events and operational data; Annapolis, MD (United States); 29-30 Jan 1992)			
Summ.	17:31019	*See* NUREG/CP–0124			
CONF-9201113–		(International Mathematical Congress on Extrapolation and Rational Approximation; Tenerife (Spain); 13-17 Jan 1992)			
	17:32019	*See* CEA-CONF–10972			
CONF-920117–		(15. nuclear physics symposium; Oaxtepec (Mexico); 7-10 Jan 1992)			
	17:32253	*See* GANIL-P–92-05			
CONF-920124–		(Society of Photo-Optical Instrumentation Engineers' international symposium on laser spectroscopy as part of SPIE's symposium on optics, electro-optics and laser applications in science and engineering; Los Angeles, CA (United States); 19-24 Jan 1992)			
26	17:32477	*See* UCRL-JC–109555			
27	17:31420	*See* UCRL-JC–107973			
CONF-920126–		(13. international conference on few body problems in physics; Adelaide (Australia); 5-11 Jan 1992)			
4	17:32188	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018854	MF-414
CONF-920146–		(ASTM international symposium on small specimen test techniques and their applications to nuclear reactor vessel thermal annealing and plant life extension; New Orleans, LA (United States); 29-31 Jan 1992)			
5	17:30948	*See* PNL-SA–19682			
CONF-920195–		(20. international workshop on gross properties of nuclei and nuclear excitation: Heavy-ion collisions at intermediate and high energies; Hirschegg (Austria); 20-25 Jan 1992)			
	17:32285	*See* INIS-mf–14069			
CONF-9202106–		(Advanced heat exchangers; Herndon, VA (United States); 13 Feb 1992)			
Summ.	17:31095	OSTI; NTIS; GPO Dep.	E 1.99:	DE92014385	PC-310
CONF-9202117–		(Physics of isolated pulsars workshop; Taos, NM (United States); 23-28 Feb 1992)			
4	17:32057	*See* LA-UR–92-2545			
CONF-9202128–		(Karpacz winter school on infinite dimensional geometry in physics; Karpacz (Poland); 17 Feb 1992)			
	17:32125	*See* NIKHEF-H–92-07			
CONF-9202134–		(Workshop on 'spin-charge transfer reaction in atomic collision process' for planning of next period of cascade project; Ibarakai (Japan); 29 Feb 1992)			
	17:32359	*See* RCNP-T–30			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-920253–		(International Centre for Theoretical Physics (ICTP) workshop on computation and analysis of nuclear data relevant to nuclear energy and safety; Trieste (Italy); 10 Feb - 15 mar 1992)			
2	17:32271	*See* ANL/CP–76673			
CONF-920289–		(Conference on state regulation and the market potential for natural gas: challenges and opportunities; Phoenix, AZ (United States); 3-5 Feb 1992)			
	17:30593	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92016374	MF-131
CONF-920305–		(Minerals, Metals, and Materials Society (TMS) annual meeting and exhibition; San Diego, CA (United States); 1-5 Mar 1992)			
13	17:31228	*See* EGG-M–91349			
14	17:31215	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040031	MF-404; MF-405
CONF-9203101–		(CERN accelerator school on magnetic measurement and alignment; Montreux (Switzerland); 16-20 Mar 1992)			
2	17:31523	*See* SLAC-PUB–5822			
CONF-920311–		(10. international conference on plasma-surface interactions in controlled fusion devices; Monterey, CA (United States); 30 Mar - 3 apr 1992)			
23	17:32470	*See* SAND–92-0370C			
24	17:32474	*See* UCRL-JC–108860			
25	17:32475	*See* UCRL-JC–108861			
CONF-9203139–		(Laser guide star adaptive optics workshop; Albuquerque, NM (United States); 10-12 Mar 1992)			
2	17:32064	*See* UCRL-JC–109552			
CONF-920315–		(3. European particle accelerator conference; Berlin (Germany); 24-28 Mar 1992)			
	17:31451	*See* CEA-LNS-GT–92-01			
CONF-9203159–		(9. international workshop on photon-photon collisions; San Diego, CA (United States); 22-26 Mar 1992)			
7	17:32184	*See* SLAC-PUB–5819			
CONF-9203164–		(International workshop on the physics and techniques of secondary nuclear beams; Dourdan (France); 23-25 Mar 1992)			
2	17:31430	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019185	MF-414
CONF-9203173–		(1992 conference on microlithography; San Jose, CA (United States); 8-13 Mar 1992)			
1	17:31610	OSTI; NTiS; GPO Dep.	E 1.99:	DE92018926	MF-406
CONF-9203174–		(International workshop on nonlinear problems in accelerator physics; Berlin (Germany); 30 Mar - 2 apr 1992)			
1	17:31445	*See* ANL/CP–76665			
CONF-9203176–		(Texas workshop on electroweak baryon number violation; New Haven, CT (United States); 18-21 Mar 1992)			
1	17:32122	*See* LA-UR–92-2471			
CONF-9203177–		(Society Photography Institute of Engineers (SPIE) microlithography '92; San Jose, CA (United States); 8-13 Mar 1992)			
1	17:31413	*See* LA-UR–92-1901			
2	17:31419	*See* SAND–92-0971C			
CONF-9203178–		(The euromagtech workshop; Ross Priory (United Kingdom); 26-28 Mar 1992)			
1	17:31360	*See* LA-UR–92-1916			
CONF-9203181–		(Workshop on harmonic oscillators; Baltimore, MD (United States); 25-28 Mar 1992)			
1-Rev.	17:32047	*See* SLAC-PUB–5733-Rev.			
CONF-9203185–		(International Symposium on Material Chemistry in Nuclear Materials; Tsukuba (Japan); 12-13 Mar 1992)			
	17:31208	*See* CEA-CONF–10945			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9203187–		(GRECO Automation - Meeting of the robotics group; Paris (France); 5-6 Mar 1992)			
	17:31348	*See* CEA-CONF–10941			
CONF-9203188–		(Interdisciplinary Conference on Dielectrics: properties, characterisation and applications; Antibes (France); 23-27 Mar 1992)			
	17:32370	*See* CEA-CONF–10940			
CONF-920362–		(9. topical conference on high-temperature plasma diagnostics; Santa Fe, NM (United States); 15-19 Mar 1992)			
41	17:32473	*See* UCRL-JC–103286			
CONF-920402–		(Material Research Society spring meeting; San Francisco, CA (United States); 27 Apr - 2 may 1992)			
49	17:31253	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018772	MF-310
50	17:32374	*See* SAND–91-2592C			
51	17:31264	*See* UCRL-JC–110481			
52	17:31283	*See* UCRL-JC–110324			
53	17:32367	*See* UCRL-JC–110652			
54	17:31280	*See* UCRL-JC–108831			
CONF-920405–		(Spring meeting of the American Physical Society; Washington, DC (United States); 12-20 Apr 1992)			
1	17:31464	*See* SLAC-PUB–5725			
CONF-920409–		(12. general conference of the Condensed Matter Division of the European Physical Society; Prague (Czechoslovakia); 6-9 Apr 1992)			
	17:32372	*See* INIS-mf–13336			
CONF-9204120–		(Soft-x-ray projection lithography topical meeting; Monterey, CA (United States); 6-8 Apr 1992)			
3	17:31244	*See* UCRL-JC–110360			
CONF-9204126–		(B factories: state of the art in accelerators, detectors, and physics; Stanford, CA (United States); 6-10 Apr 1992)			
4	17:31542	*See* BNL–47776			
5	17:31522	*See* SLAC-PUB–5800			
6	17:31466	*See* SLAC-PUB–5830			
CONF-9204138–		(International conference of radiation-tolerant scintillators and detectors; Tallahassee, FL (United States); 28 Apr - 2 may 1992)			
7	17:31603	*See* FNAL-TM–1784			
Summ.	17:31541	*See* ANL-HEP-CP–92-46			
CONF-9204146–		(Fusion Power Associates annual meeting and symposium; Pleasanton, CA (United States); 9 Apr 1992)			
4	17:32459	*See* GA-A–20914			
CONF-9204147–		(25. oil shale symposium; Golden, CO (United States); 21 Apr 1992)			
4	17:30602	*See* UCRL-JC–109240			
5	17:30601	*See* UCRL-JC–109241			
CONF-9204170–		(Neutral particle beam technical symposium and scientific exchange; Argonne, IL (United States); 28 Apr - 1 may 1992)			
2	17:31472	*See* ANL/CP–76664			
CONF-9204176–		(3. annual regional conference on hazardous materials and hazardous wastes; Idaho Falls, ID (United States); 7-8 Apr 1992)			
1	17:30686	*See* EGG-M–92047			
2	17:32007	*See* EGG-M–92025			
CONF-9204181–		(4. international conference on hyperbolic problems; Taormina (Italy); 3-8 Apr 1992)			
1	17:32365	*See* LA-UR–92-2083			
CONF-9204182–		(Franklin symposium; Philadelphia, PA (United States); 29 Apr - 1 may 1992)			
1	17:32202	*See* LA-UR–92-1768			
CONF-9204185–		(1. Center for Research on Parallel Computing (CRPC) workshop on standards for message passing in a distributed memory environment; Williamsburg, VA (United States); 29-30 Apr 1992)			
Summ.	17:32559	*See* ORNL/TM–12147			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-920419–		(International Sherwood fusion theory conference; Santa Fe, NM (United States); 6-8 Apr 1992)			
Absts.	17:32402	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018756	MF-700
CONF-9204190–		(Smoke and obscurants symposium; Laurel, MD (United States); 14-16 Apr 1992)			
1	17:31627	*See* SAND–91-2768C			
CONF-9204191–		(French-Spanish Conference on Fracture Mechanic; Aiguablava (Spain); 1-3 Apr 1992)			
	17:31207	*See* CEA-CONF–10944			
CONF-9204192–		(X-ray Colloquium; Saint-Denis (France); 6-10 Apr 1992)			
	17:31206	*See* CEA-CONF–10943			
CONF-9204194–		(Symposium on the Promotion of the Application of local Fracture/Damage Models to Engineering Fracture Problems; Tempe, AZ (United States); 28 Apr - 1 may 1992)			
	17:31209	*See* CEA-CONF–10969			
CONF-920426–		(17. annual atomic spectroscopy safeguards and security (SAS) users group international symposium; Honolulu, HI (United States); 12 Apr 1992)			
3	17:32518	*See* EGG-M–91471			
CONF-920427–		(Energy and environment: transitions in Eastern Europe; Prague (Czechoslovakia); 20-23 Apr 1992)			
	17:30485	*See* INIS-mf–13353			
CONF-920430–		(3. international high level radioactive waste management (IHLRWM) conference; Las Vegas, NV (United States); 12-16 Apr 1992)			
	17:30658	*See* CEA-CONF–10975			
CONF-920444–		(American Chemical Society national meeting; San Francisco, CA (United States); 5-10 Apr 1992)			
32	17:30428	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018500	MF-108
33	17:30429	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018950	MF-108
34	17:30430	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019555	MF-108
35	17:30431	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019554	MF-108
CONF-920448–		(94. annual meeting and exposition of the American Ceramic Society; Minneapolis, MN (United States); 12-16 Apr 1992)			
7	17:31254	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019285	MF-332
CONF-9205107–		(COAL PREP '92: 9th international coal preparation exhibition and conference; Cincinnati, OH (United States); 3-7 May 1992)			
1	17:30421	*See* DOE/MC/11076–92/C0041			
CONF-9205108–		(International conference on nuclear structure at high angular momentum; Ottawa (Canada); 18-21 May 1992)			
11	17:31540	*See* ANL/CP–76648			
12	17:32243	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019177	MF-413
CONF-9205137–		(International seminar on physics and gas dynamics of shock waves; Minsk (Russian Federation); 27 May - 2 jun 1992)			
2	17:31366	*See* UCRL-JC–110355			
CONF-9205147–		(10. symposium on energy engineering sciences; Argonne, IL (United States); 11-13 May 1992)			
	17:31351	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018777	MF-400
CONF-920515–		(9. international conference on high power particle beams; Washington, DC (United States); 25-29 May 1992)			
32	17:31421	*See* UCRL-JC–108748			
CONF-9205196–		(40. ASMS conference on mass spectrometry and allied topics; Washington, DC (United States); 31 May - 2 jun 1992)			
6	17:31763	*See* PNL-SA–20440			
7	17:31762	*See* PNL-SA–20437			
4-Extd.Abst.	17:31765	*See* PNL-SA–20446			
5-Extd.Abst.	17:31764	*See* PNL-SA–20444			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9205214–		(High speed computing conference; Glenenden Beach, OR (United States); 11-14 May 1992)			
	17:32510	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040405	MF-705
CONF-9205226–		(Conference on luminous high-latitude stars; Boston, MA (United States); 28-30 May 1992)			
3	17:32053	*See* LA-UR–92-2138			
CONF-9205228–		(15. international Warsaw meeting on elementary particle physics; Kazimierz (Poland); 25-29 May 1992)			
1	17:32128	*See* SSCL-Preprint–123			
CONF-9205229–		(Center for Nonlinear Studies (CNLS) conference; Los Alamos, NM (United States); May 1992)			
1	17:32361	*See* LA-UR–92-2320			
CONF-920523–		(3. international colloquium on x-ray lasers; Schliersee (Germany); 18-22 May 1992)			
2	17:31425	*See* UCRL-JC–110043			
3	17:31423	*See* UCRL-JC–109844			
4	17:31422	*See* UCRL-JC–109843			
5	17:31424	*See* UCRL-JC–109845			
CONF-9205234–		(The hadron structure workshop; Brookhaven, NY (United States); 28-29 May 1992)			
1	17:32201	*See* LA-UR–92-1736			
CONF-9205235–		(International Atomic Energy Agency (IAEA) specialists meeting on integrity of pressure components of reactor systems; Paks (Hungary); 25-29 May 1992)			
1	17:30900	*See* SAND–92-0663C			
CONF-9205236–		(Conference on phase separation in cuprate superconductors; Sicily (Italy); 6-12 May 1992)			
1	17:31248	*See* BNL–47796			
2	17:32390	*See* LA-UR–92-1844			
3	17:32387	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019952	MF-411
CONF-9205237–		(1992 Mid-Atlantic nuclear training managers instructor workshop; Harrisburg, PA (United States); 4-6 May 1992)			
1	17:32490	*See* EGG-M–92340			
CONF-9205238–		(Workshop on strangeness in nuclei; Krakow (Poland); 5-7 May 1992)			
1	17:32274	*See* BNL–47765			
2	17:32273	*See* BNL–47764			
CONF-920527–		(1992 incineration conference; Albuquerque, NM (United States); 11-14 May 1992)			
8	17:31322	*See* UCRL-JC–108867			
CONF-920541–		(5. workshop on containment integrity for nuclear power plants; Washington, DC (United States); 12-14 May 1992)			
	17:31018	*See* NUREG/CP–0120			
CONF-920548–		(Workshop on large gamma-ray detector arrays; Ottawa (Canada); 18-23 May 1992)			
3	17:31601	*See* UCRL-JC–111174			
CONF-920555–		(4. international spring seminar on nuclear physics: the building blocks of nuclear structure; Amalfi (Italy); 18-22 May 1992)			
2	17:32272	*See* ANL/CP–76820			
CONF-920584–		(US Department of Energy contractor review meeting on natural gas research and development; Morgantown, WV (United States); 5-6 May 1992)			
25	17:30588	*See* DOE/MC/26026–C0042			
26	17:30587	*See* SAND–92-1648C			
27	17:30591	*See* DOE/METC/C–92/7024			
28	17:30590	*See* DOE/METC/C–92/7023			
CONF-920606–		(American Nuclear Society annual meeting; Boston, MA (United States); 7-12 Jun 1992)			
31	17:30722	*See* SAND–92-1226C			
37	17:31000	*See* BNL-NUREG–47342			
38	17:30715	*See* PNL-SA–21033			
40	17:31063	*See* WHC-SA–1584			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-920607–		(10. topical meeting on technology of fusion energy; Boston, MA (United States); 7-12 Jun 1992)			
18	17:32457	*See* EGG-M–91508			
19	17:32478	*See* UCRL-JC–110036			
CONF-9206106–		(5. conference on human factors and power plants: power generation - the next decade and beyond; Monterey, CA (United States); 7-11 Jun 1992)			
3	17:31001	*See* BNL-NUREG–47766			
CONF-9206112–		(1992 American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) meeting; Baltimore, MD (United States); 27 Jun - 1 jul 1992)			
3	17:31142	*See* PNL-SA–20310			
CONF-9206114–		(Annual meeting of the Air and Waste Management Association (AWMA); Kansas City, MO (United States); 21-26 Jun 1992)			
15	17:31057	*See* PNL-SA–20781			
16	17:30712	*See* PNL-SA–20275			
CONF-9206116–		(9. international conference on computational methods in water resources; Denver, CO (United States); 9-12 Jun 1992)			
3	17:31728	*See* PNL-SA–20742			
4	17:31727	*See* PNL-SA–20622			
CONF-9206130–		(International Institute of Refrigeration meeting on refrigeration, energy and environment; Trondheim (Norway); 22-24 Jun 1992)			
2	17:31679	*See* UCRL-JC–110859			
CONF-920614–		(International cryogenic engineering conference and the international cryogenic materials conference; Kiev (Ukraine); 8-12 Jun 1992)			
2	17:31247	*See* ANL/CP–76805			
CONF-9206152–		(International joint technology workshop on fuzzy logic and neural networks; Houston, TX (United States); 1-3 Jun 1992)			
1	17:32511	OSTI; NTIS; GPO; OSTI; NTIS; GPO Dep.	E 1.99:		MF-405
CONF-920617–		(Annual meeting of the Health Physics Society; Columbus, OH (United States); 21-25 Jun 1992)			
11	17:31995	*See* PNL-SA–20453			
CONF-9206173–		(3. international conference on trends in welding research; Gatlinburg, TN (United States); 1-5 Jun 1992)			
7	17:31358	*See* EGG-M–92300			
CONF-9206174–		(14. international symposium on molecular beams; Pacific Grove, CA (United States); 7-12 Jun 1992)			
	17:32379	*See* LBL–32305			
CONF-9206179–		(Arms control and verification technology; Williamsburg, VA (United States); 2-4 Jun 1992)			
4	17:31195	*See* ANL/CP–75530			
CONF-9206180–		(14. combustion research meeting; Department of Energy-Basic Energy Sciences (DOE-BES) combustion research meeting; Tahoe City, CA (United States); Lake Geneva, WI (United States); 14-17 Jun 1992; 28-31 may 1991)			
2	17:31343	*See* ANL/CP–72683			
CONF-9206181–		(Risk Management conference; Boston, MA (United States); 7-11 Jun 1992)			
4	17:32497	*See* PNL-SA–20410			
CONF-9206183–		(2. international symposium on nuclear analytical chemistry; Toronto (Canada); 3-5 Jun 1992)			
2	17:30714	*See* PNL-SA–20460			
CONF-9206193–		(Advanced accelerator concepts workshop; Port Jefferson, NY (United States); 14-20 Jun 1992)			
5	17:31429	*See* BNL–47785			
6	17:32189	*See* FNAL/C–92/165			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9206203–		(CEBAF summer workshop; Newport News, VA (United States); 15-19 Jun 1992)			
2	17:31471	*See* ANL/CP–76610			
CONF-9206224–		(International conference on monitoring toxic chemicals and biomarkers; Berlin (Germany); 22-26 Jun 1992)			
1	17:31692	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018491	MF-402
CONF-9206226–		(11. annual working group institute on synthesis of high energy density materials; Monticello, NY (United States); 8-11 Jun 1992)			
1	17:31631	*See* LA-UR–92-2388			
CONF-9206228–		(Conference on pathways to radiation damage in DNA; Rochester, MI (United States); 14-18 Jun 1992)			
1	17:31996	*See* PNL-SA–20943			
CONF-9206229–		(1992 conference on radiation and health; Hilton Head Island, SC (United States); 28 Jun - 2 jul 1992)			
1	17:31997	*See* PNL-SA–21038			
2	17:31998	*See* PNL-SA–21090			
CONF-9206230–		(Symposium on building systems automation integration; Dallas, TX (United States); 10-12 Jun 1992)			
1	17:31117	*See* PNL-SA–20969			
CONF-9206231–		(16. annual army environmental R&D symposium; Williamsburg, VA (United States); 23-25 Jun 1992)			
1	17:31630	*See* LA-UR–92-2378			
2	17:31638	*See* LA-UR–92-1980			
CONF-9206233–		(16. annual army environmental quality R&D symposium; Williamsburg, VA (United States); 23-25 Jun 1992)			
1	17:30706	*See* LA-UR–92-2071			
CONF-9206234–		(International conference on advances in corrosion and protection; Manchester (United Kingdom); 28 Jun 1992)			
1	17:31216	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017824	MF-114
CONF-9206237–		(1992 industrial ergonomics annd safety conference; Denver, CO (United States); 10-14 Jun 1992)			
1	17:31623	*See* PNL-SA–20626			
CONF-9206238–		(3. international conference on aluminium alloys, their physical & mechanical properties; Trondheim (Norway); 22-26 Jun 1992)			
1	17:31217	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019181	MF-313
CONF-9206239–		(60. Military Operations Research society symposium; Monterey, CA (United States); 23-25 Jun 1992)			
1	17:31624	*See* PNL-SA–20720			
CONF-9206240–		(2. LDEF post-retrieval symposium; San Diego, CA (United States); 1-5 Jun 1992)			
1	17:32251	*See* LA-UR–92-2268			
CONF-9206241–		(Z.S. Basinski international symposium on crystal plasticity; Kingston (Canada); 16 Jun 1992)			
1	17:31235	*See* LA-UR–92-2400			
CONF-9206243–		(Workshop on ion mobility spectrometry; Ruidoso, NM (United States); 22-26 Jun 1992)			
2	17:31318	*See* LA-UR–92-1953			
CONF-9206244–		(Symposium on computer-enhanced analytical spectroscopy; Snowbird, UT (United States); 19 Jun 1992)			
1	17:31304	*See* LA-UR–92-1978			
CONF-9206249–		(Origin & evolution of the elements conference; Paris (France); 22-25 Jun 1992)			
1	17:31637	*See* LA-UR–92-1783			
2	17:32059	*See* LA-UR–92-2548			
CONF-9206250–		(Department of Energy (DOE) workshop in surface diffusion in the growth of materials; Santa Fe, NM (United States); 1-3 Jun 1992)			
1	17:31278	*See* SAND–92-1267C			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9206251–		(Physics beyond the standard model III conference; Ottawa (Canada); 22-24 Jun 1992)			
1	17:32185	*See* ANL-HEP-CP–92-47			
CONF-9206252–		(23. summer school on theoretical physics Moscow Engineering Physics Institute (MEPhI); Tver' Oblast (USSR); 1-5 Jun 1992)			
1	17:32364	*See* LA-UR–92-1993			
CONF-9206253–		(Swanson Analysis Systems Technology conference; Pittsburg, PA (United States); 8-11 Jun 1992)			
1	17:31277	*See* PNL-SA–21006			
CONF-9206254–		(Air pollutants and plant metabolism conference; Blacksburg, VA (United States); 13-16 Jun 1992)			
1	17:31687	*See* BNL–47624			
2	17:31749	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019946	MF-402
CONF-9206255–		(11. international conference on spectra line shapes; Carry Le Rouet (France); 8-12 Jun 1992)			
1	17:31426	*See* UCRL-JC–110209			
CONF-9206256–		(4. Arizona weather symposium; Scottsdale, AZ (United States); 10-12 Jun 1992)			
1	17:31668	*See* PNL-SA–20809			
CONF-9206257–		(15. annual review conference on atmospheric transmission models; Bedford, MA (United States); 2-3 Jun 1992)			
1	17:31676	*See* UCRL-JC–110364			
CONF-9206260–		(1. thematic conference on remote sensing for marine and coastal environments; New Orleans, LA (United States); 15-17 Jun 1992)			
2	17:32015	*See* PNL-SA–21206			
CONF-9206268–		(New aspects of magellanic cloud research; Heidelburg (Germany); 15-17 Jun 1992)			
1	17:32058	*See* LA-UR–92-2547			
CONF-9206272–		(ANSYS Technology Conference and Exhibition; Pittsburgh PA (United States); 8-12 Jun 1992)			
	17:32454	*See* ECN-RX–92-013			
CONF-920630–		(1. world congress for electricity and magnetism in biology and medicine; Orlando, FL (United States); 14-29 Jun 1992)			
1	17:32006	*See* PNL-SA–20368			
CONF-920631–		(American Society of Mechanical Engineers pressure vessel and piping conference; New Orleans, LA (United States); 21-25 Jun 1992)			
44	17:30941	*See* EGG-M–91449			
CONF-920637–		(International conference on the structure of baryons and related mesons; New Haven, CT (United States); 1-4 Jun 1992)			
4	17:32151	*See* ANL/CP–76715			
CONF-920671–		(20. international power modulator symposium; Myrtle Beach, SC (United States); 23-25 Jun 1992)			
10	17:31526	*See* SLAC-PUB–5863			
CONF-920673–		(16. annual symposium of American Society of Testing and Materials (ASTM); Denver, CO (United States); 21-22 Jun 1992)			
8	17:31237	*See* PNL-SA–19946			
9	17:32467	*See* PNL-SA–19956			
10	17:32466	*See* PNL-SA–19945			
CONF-920683–		(2. international symposium on nuclear excited states; Lodz (Poland); 22-26 Jun 1992)			
2	17:32240	*See* ANL/CP–76821			
CONF-920694–		(Spring meeting of the European Materials Research Society: international conference on electronic materials; Strasbourg (France); 2-5 Jun 1992)			
2	17:31268	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019180	MF-404
CONF-920706–		(15. international conference on high energy accelerators; Hamburg (Germany); 20-24 Jul 1992)			
14	17:31446	*See* BNL–47266			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
15	17:31447	*See* BNL–47267			
16	17:31465	*See* SLAC-PUB–5742			
17	17:31428	*See* BNL–47784			
18	17:31475	*See* BNL–47104			
19	17:31474	*See* BNL–47103			
20	17:31476	*See* BNL–47119			
21	17:31427	*See* BNL–47142			
22	17:31440	*See* SLAC-PUB–5844			
23	17:31524	*See* SLAC-PUB–5848			
24	17:31478	*See* BNL–47149			
25	17:31477	*See* BNL–47148			
27	17:31441	*See* SLAC-PUB–5864			
CONF-920708–		(2. international nuclear physics conference; Wiesbaden (Germany); 26 Jul - 1 aug 1992)			
1	17:32212	*See* ANL/CP–74960			
CONF-9207102–		(Institute of Nuclear Materials Management (INMM) annual meeting; Orlando, FL (United States); 19-22 Jul 1992)			
24	17:32484	*See* LA-UR–92-2158			
31	17:30708	*See* LA-UR–92-2306			
40	17:30774	*See* SAND–92-0472C			
41	17:30770	*See* LA-UR–92-2290			
44	17:30760	*See* LA-UR–92-2332			
45	17:30709	*See* LA-UR–92-2331			
46	17:30771	*See* LA-UR–92-2327			
47	17:30765	*See* BNL–45080			
48	17:30713	*See* PNL-SA–20430			
49	17:31352	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019291	MF-523
52	17:30648	*See* SAND–92-1645C			
53	17:30777	*See* UCRL-JC–110104			
54	17:31196	*See* BNL–47088			
55	17:30778	*See* UCRL-JC–111078			
58	17:30644	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019483	MF-513
60	17:31353	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019945	MF-906
62	17:30776	*See* UCRL-JC–109620			
63	17:31305	*See* LA-UR–92-2859			
CONF-9207112–		(2. symposium on plasma dynamics; Trieste (Italy); 8-10 Jul 1992)			
2	17:32435	*See* PPPL-CFP–2654			
CONF-9207115–		(Japan-US seminar on two-phase flow dynamics; San Francisco, CA (United States); 6-10 Jul 1992)			
1	17:31390	*See* EGG-M–92378			
CONF-9207116–		(Conference on dynamics of globular clusters; Berkeley, CA (United States); 15-17 Jul 1992)			
1	17:32056	*See* LA-UR–92-2495			
CONF-9207117–		(6. international conference on magnetic fluids; Paris (France); 20-24 Jul 1992)			
1	17:32049	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018865	MF-411
CONF-9207118–		(Beacon satellite symposium; Boston, MA (United States); 5-12 Jul 1992)			
1	17:32052	*See* LA-UR–92-2125			
CONF-9207123–		(International Atomic Energy Agency (IAEA) specialists' meeting; Juelich (Germany); 6-10 Jul 1992)			
1	17:30903	*See* GA-A–20998			
CONF-9207124–		(2. international symposium on electrochemical impedance spectroscopy; Santa Barbara, CA (United States); 12-17 Jul 1992)			
1	17:31321	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017812	MF-404
CONF-9207126–		(8. annual ACS/EPA waste, testing and quality assurance symposium; Washington, DC (United States); 16 Jul 1992)			
1	17:30705	*See* LA-UR–92-1920			
CONF-9207127–		(Summer symposium on science; Seoul (Korea, Republic of); 6-10 Jul 1992)			
1	17:32468	*See* PPPL-CFP–2621			
CONF-9207128–		(Quantitative infrared thermography; Chatillon Cedex (France); 7-9 Jul 1992)			
1	17:31470	*See* ANL/CP–76582			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9207136–		(American National Standards Institute (ANSI) X3J16/ISO WG21 meeting; Toronto (Canada); 12-18 Jul 1992)			
1	17:32563	*See* SAND–92-1655C			
CONF-920721–		(6. international conference on nuclei far from stability and 9th international conference on atomic masses and fundamental constants; Bernkastel-Kues (Germany); 19-24 Jul 1992)			
6	17:31620	*See* PNL-SA–21150			
7	17:32213	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019938	MF-413
8	17:32244	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019937	MF-413
9	17:32245	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040024	MF-413
CONF-920732–		(2. Nuclear Regulatory Commission (NRC)/American Society of Mechanical Engineers (ASME) symposium on pump and valve testing; Washington, DC (United States); 21-23 Jul 1992)			
7	17:30942	*See* EGG-M–92451			
CONF-920735–		(10. international conference on vacuum ultraviolet radiation physics; Paris (France); 27-31 Jul 1992)			
3	17:32360	*See* BNL–47814			
CONF-920736–		(Coal preparation, utilization, and environmental control conference; Pittsburgh, PA (United States); 26-31 Jul 1992)			
4	17:30475	*See* ANL/CP–76723			
CONF-920747–		(28. joint propulsion conference; Nashville, TN (United States); 6-8 Jul 1992)			
8	17:30917	*See* SAND–92-1566C			
CONF-920748–		(US Department of Energy contractors review meeting on fuel cells; Morgantown, WV (United States); 14-15 Jul 1992)			
1	17:31078	*See* ANL/CP–76365			
4	17:31088	*See* PNL-SA–21162			
5	17:31082	*See* DOE/MC/24221–92/C0056			
6	17:31081	*See* DOE/ER/81156–92/C0059			
7	17:31080	*See* DOE/ER/80910–92/C0058			
9	17:31084	*See* DOE/MC/27168–92/C0051			
10	17:31085	*See* DOE/MC/27394–92/C0050			
14	17:31079	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001292	MF-110
CONF-920768–		(Conference on physics and engineering of advanced detectors and collection/focusing systems; San Diego, CA (United States); 19-24 Jul 1992)			
3	17:30781	*See* ANL/CP–76789			
CONF-920771–		(1992 summer computer simulation conference; Reno, NV (United States); 27-30 Jul 1992)			
5	17:31674	*See* UCRL-JC–108957			
CONF-920791–		(Information exchange meeting on characterization sensors and monitoring; Dallas, TX (United States); 15-16 Jul 1992)			
7	17:31307	*See* PNL-SA–21138			
CONF-920792–		(SPIE international symposium on optical applied science and engineering; San Diego, CA (United States); 19-24 Jul 1992)			
4	17:31634	*See* SAND–91-2804C			
18	17:32054	*See* LA-UR–92-2431			
22	17:31539	*See* ANL/CP–76585			
25	17:32476	*See* UCRL-JC–109256			
26	17:31614	*See* ANL/CP–76870			
27	17:32055	*See* LA-UR–92-2457			
CONF-920796–		(18. international pyrotechnics seminar; Breckenridge, CO (United States); 13-17 Jul 1992)			
7	17:31632	*See* MLM–3757(OP)			
8	17:31633	*See* MLM–3758(OP)			
CONF-920799–		(Review of progress in quantitative non destructive evaluation (NDE); La Jolla, CA (United States); 19-24 Jul 1992)			
1	17:31625	*See* PNL-SA–20954			
Absts.	17:31404	*See* IS–5081			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-920802–		(Applied superconductivity conference; Chicago, IL (United States); 23-28 Aug 1992)			
1	17:32391	*See* LA-UR–92-2864			
CONF-920808–		(American Institute of Chemical Engineers summer national meeting; Minneapolis, MN (United States); 9-12 Aug 1992)			
5	17:31330	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019282	MF-501
CONF-9208108–		(Workshop on computer security incident handling; Denver, CO (United States); Aug 1992)			
1	17:30769	*See* LA-UR–92-2184			
CONF-9208109–		(16. international LINAC conference; Ottawa (Canada); 23-28 Aug 1992)			
1	17:31506	*See* LA-UR–92-2355			
2	17:31507	*See* LA-UR–92-2420			
3	17:31508	*See* LA-UR–92-2422			
4	17:31441	*See* SLAC-PUB–5864			
5	17:31510	*See* LA-UR–92-2666			
8	17:31461	*See* LA-UR–92-2583			
9	17:31509	*See* LA-UR–92-2553			
10	17:31514	*See* LA-UR–92-2705			
11	17:31511	*See* LA-UR–92-2692			
12	17:31515	*See* LA-UR–92-2706			
13	17:31513	*See* LA-UR–92-2704			
14	17:31512	*See* LA-UR–92-2703			
CONF-9208110–		(33. Yamada conference on the application of high magnetic fields in semiconductor physics; Chiba (Japan); 3-7 Aug 1992)			
1	17:32381	*See* ANL/CP–76653			
CONF-9208111–		(12. international conference on chemical thermodynamics and 47th calorimetry conference; Snowbird, UT (United States); 16-21 Aug 1992)			
1	17:31310	*See* ANL/CP–75257			
CONF-9208112–		(1992 JANNAF Safety and Environmental Subcommittee meeting; 1992 Federation of Analytical Chemistry and Spectroscopy Socieitier (FACSS) conference; Monterey, CA (United States); Philadelphia, PA (United States); 10-14 Aug 1992; 20-25 sep 1992)			
1	17:31686	*See* ANL/CP–76749			
2	17:31675	*See* UCRL-JC–109697			
CONF-9208113–		(1992 Society of Automotive Engineers (SAE) future transportation technology conference; Costa Mesa, CA (United States); 10-13 Aug 1992)			
1	17:31043	*See* ANL/CP–76687			
CONF-9208114–		(American Nuclear Society meeting; Jackson Hole, WY (United States); 16-19 Aug 1992)			
1	17:30914	*See* EGG-M–92359			
2	17:32348	*See* LA-UR–92-1805			
CONF-9208116–		(Union Radio Science International (URSI) electromagnetic theory symposium; Sydney (Australia); 17 Aug 1992)			
1	17:32061	*See* SAND–92-1501C			
CONF-9208117–		(1992 safety analysis workshop; Salt Lake City, UT (United States); 11-13 Aug 1992)			
2	17:30762	*See* RFP–4592			
3	17:32002	*See* RFP–4590			
8	17:30764	*See* WSRC-MS–92-286			
CONF-9208118–		(18. conference Latin American of information; Las Palmas de Gran (Spain); 31 Aug - 4 sep 1992)			
1	17:32567	*See* UCRL-JC–111089			
CONF-9208119–		(35. Midwest symposium on circuits and systems; Washington, DC (United States); 12 Aug 1992)			
1	17:31417	*See* SAND–92-0661C			
2	17:31416	*See* SAND–92-0660C			
3	17:31418	*See* SAND–92-0669C			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9208120–		(1992 space operations, applications and research conference; Houston, TX (United States); 5-7 Aug 1992)			
1	17:31365	*See* SAND–92-1821C			
CONF-9208123–		(1992 Westinghouse electronic systems group statistics symposium; Baltimore, MD (United States); 7 Aug 1992)			
1	17:32501	*See* WSRC-MS–92-249			
CONF-9208124–		(Power electronics technology and applications development, transfer and commercialization workshop; Orlando, FL (United States); 5-7 Aug 1992)			
1	17:31060	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019951	MF-310
CONF-9208126–		(4. symposium on nucleation and crystallization; Stone Mountain, GA (United States); 16-19 Aug 1992)			
1	17:30743	*See* WSRC-MS–92-279			
CONF-9208129–		(41. annual Denver x-ray conference; Denver, CO (United States); Aug 1992)			
1	17:32041	*See* LA-UR–92-2536			
CONF-920815–		(204. American Chemical Society national meeting; Washington, DC (United States); 23-28 Aug 1992)			
4	17:30461	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018529	MF-113
5	17:31157	*See* SAND–92-8507			
CONF-920828–		(American Council for an Energy-Efficient Economy summer study on energy efficiency in buildings; Pacific Grove, CA (United States); 30 Aug - 5 sep 1992)			
9	17:31115	*See* NREL/TP–441-4824			
CONF-920837–		(15. international conference on high energy accelerators; 26. international conference on high energy physics; 16. international LINAC conference; Hamburg (Germany); Dallas, TX (United States); Ottawa (Canada); 20-24 Jul 1992; 6-12 aug 1992; 23-28 aug 1992)			
1	17:31441	*See* SLAC-PUB–5864			
CONF-920851–		(Spectrum '92: nuclear and hazardous waste management international topical meeting; Boise, ID (United States); 23-27 Aug 1992)			
67	17:30736	*See* UCRL-JC–109563			
68	17:30737	*See* UCRL-JC–109653			
69	17:30738	*See* UCRL-JC–109993			
CONF-920887–		(8. international symposium on thermodynamics of nuclear materials; Snowbird, UT (United States); 16-21 Aug 1992)			
1	17:31204	*See* ANL/CP–76649			
CONF-920891–		(5. Asia-Pacific electron microscopy conference; Beijing (China); 1-6 Aug 1992)			
3	17:31273	*See* LA-UR–92-2557			
CONF-920892–		(1992 American Society for Photogrammetry and Remote Sensing/American Congress on Surveying and Mapping/Resource Technology (ASPRS/ACSM/RT) convention on monitoring and mapping global change; Washington, DC (United States); 3-8 Aug 1992)			
3	17:31525	*See* SLAC-PUB–5862			
CONF-920903–		(International topical meeting on reactor thermal hydraulics: towards the next generation of nuclear power plants; Salt Lake City, UT (United States); 20-24 Sep 1992)			
11	17:31401	*See* SAND–92-1795C			
12	17:30910	*See* ANL/CP–74685			
13	17:32363	*See* ANL/CP–74717			
14	17:30901	*See* ANL/CP–75204			
15	17:30997	*See* ANL/CP–75321			
16	17:31388	*See* EGG-M–91505			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-920905–		(10. international symposium on the packaging and transportation of radioactive materials: PATRAM '92; Yokohama (Japan); 13-18 Sep 1992)			
4	17:30649	*See* WHC-SA–1570			
5	17:31240	*See* SAND–91-2774C			
CONF-9209109–		(6. international conference on modelling techniques and tools for performance evaluation; Edinburgh (United Kingdom); 16-18 Sep 1992)			
2	17:32512	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019965	MF-405
CONF-920913–		(14. international conference on plasma physics and controlled nuclear fusion research; Wuerzburg (Germany); 30 Sep - 7 oct 1992)			
7	17:32403	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019493	MF-426
9	17:32413	*See* DOE/ER/53198–203			
10	17:32412	*See* DOE/ER/53198–202			
11	17:32464	*See* LA-UR–92-2582			
CONF-9209142–		(Institute of Electrical and Electronics Engineers (IEEE) international professional communications conference (IPCC): crossing frontiers; Santa Fe, NM (United States); 30 Sep 1992)			
6	17:32571	*See* ANL/CP–76315			
CONF-9209147–		(International conference on industrial uses of geothermal energy; Reykjavik (Iceland); 2-4 Sep 1992)			
1	17:30844	*See* LA-UR–92-2380			
2	17:30853	*See* BNL–47156			
CONF-9209158–		(10. symposium on turbulence and diffusion; Portland, OR (United States); 29 Sep - 2 oct 1992)			
1	17:31680	*See* WSRC-MS–92-236			
3	17:31677	*See* UCRL-JC–110377			
4	17:31678	*See* UCRL-JC–110559			
CONF-9209160–		(International symposium on energy, environment and information management; Argonne, IL (United States); 15-18 Sep 1992)			
2	17:30654	*See* ANL/CP–75688			
3	17:32572	*See* ANL/CP–76725			
4	17:31473	*See* ANL/CP–76667			
5	17:30578	*See* ANL/CP–75350			
6	17:31189	*See* ANL/CP–76765			
CONF-9209162–		(21. North American Thermal Analysis Society meeting; Atlanta, GA (United States); 13-16 Sep 1992)			
1	17:31269	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018866	MF-404
CONF-9209163–		(6. American Meteorological Society conference on mountain meteorology; Portland, OR (United States); 29 Sep - 2 oct 1992)			
1	17:31661	*See* LA-UR–92-2212			
CONF-9209164–		(New Mexico conference on the environment: toward a sustainable environment; Albuquerque, NM (United States); 13-15 Sep 1992)			
1	17:31662	*See* LA-UR–92-2425			
2	17:31133	*See* LA-UR–92-2183			
3	17:30838	*See* LA-UR–92-2489			
CONF-9209166–		(Idaho National Engineering Laboratory computing symposium; Idaho Falls, ID (United States); 22-24 Sep 1992)			
1	17:31160	*See* EGG-M–92261			
CONF-9209170–		(Methods and applications of radioanalytical chemistry (MARC) users conference; Monterey, CA (United States); 5 Sep 1992)			
1	17:31363	*See* RFP–4608			
CONF-9209171–		(JOWOG 39F and SUBWOG F-Robotics joint meeting; Monterey, CA (United States); 14-18 Sep 1992)			
1	17:31364	*See* SAND–92-1773C			
2	17:31640	*See* SAND–92-1775C			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9209172–		(5. nuclear reactor thermal-hydraulics (NURETH) conference; Salt Lake City, UT (United States); 21-24 Sep 1992)			
1	17:31002	*See* BNL-NUREG–47768			
CONF-9209174–		(International conference on shallow crack fracture mechanics tests and applications; Cambridge (United Kingdom); 26 Sep 1992)			
1	17:31218	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017813	
CONF-9209175–		(International conference on ferrites; Tokyo (Japan); 29 Sep - 2 oct 1992)			
1	17:31259	*See* LA-UR–92-2444			
CONF-9209176–		(3. international conference on vehicle navigation and information systems; Oslo (Norway); 2-4 Sep 1992)			
1	17:31119	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019943	MF-335
CONF-9209177–		(Nuclear power engineering in space nuclear rocket engines; Kazakhstan (Russian Federation); 22-26 Sep 1992)			
1	17:30915	*See* LA-UR–92-2252			
CONF-9209179–		(2. Iketani international conference on diffusion in materials (DIMAT-92); Kyoto (Japan); 7-11 Sep 1992)			
1	17:31245	*See* ANL/CP–75064			
2	17:31246	*See* ANL/CP–76698			
CONF-9209180–		(CONPAR 92: international conference on parallel processing; Lyon (France); 1-4 Sep 1992)			
1	17:32502	*See* ANL/CP–76324			
CONF-9209181–		(International Atomic Energy Agency (IAEA) technical committee meeting on tokamak plasma biasing; Montreal (Canada); 8-10 Sep 1992)			
1	17:32404	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040033	MF-420
CONF-9209183–		(1992 JANNAF Safety and Environmental Subcommittee meeting; 1992 Federation of Analytical Chemistry and Spectroscopy Socieitier (FACSS) conference; Monterey, CA (United States); Philadelphia, PA (United States); 10-14 Aug 1992; 20-25 sep 1992)			
1	17:31686	*See* ANL/CP–76749			
CONF-920966–		(10. conference on computing in high energy physics; Annecy (France); 21-25 Sep 1992)			
1	17:32557	*See* LA-UR–92-2580			
CONF-920970–		(3. conference on evolution of microstructure in metals during irradiation; Minett (Canada); 29 Sep - 2 oct 1992)			
1	17:31203	*See* ANL/CP–76480			
2	17:31200	*See* ANL/CP–74687			
3	17:31202	*See* ANL/CP–74791			
4	17:31201	*See* ANL/CP–74789			
CONF-921003–		(International conference on design and safety of advanced nuclear power plants; Tokyo (Japan); 25-28 Oct 1992)			
1	17:31004	*See* BNL-NUREG–47818			
2	17:31003	*See* BNL-NUREG–47809			
CONF-9210111–		(International Carnahan conference on security technology; Atlanta, GA (United States); 14-16 Oct 1992)			
6	17:32485	*See* SAND–91-2391C			
CONF-9210136–		(American Society of Information Science (ASIS) annual meeting; Pittsburgh, PA (United States); 26-29 Oct 1992)			
2	17:32513	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018740	MF-400
CONF-9210148–		(4. symposium on frontiers of massively parallel computing; McLean, VA (United States); 19-21 Oct 1992)			
1	17:32514	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017823	MF-405
CONF-9210149–		(14. annual international conference on IEEE Engineering in Medicine and Biology Society; Paris (France); 29 Oct - 1 nov 1992)			
1	17:31849	*See* LA-UR–92-2039			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
CONF-9210150–		(11. international acoustic emission symposium; Fukuoka (Japan); 26-29 Oct 1992)			
1	17:31239	*See* RFP–4581			
CONF-9210151–		(3. cold fusion technology conference; Nagoya (Japan); 21-25 Oct 1992)			
1	17:32432	*See* LA-UR–92-2390			
CONF-9210152–		(1992 Society of Automotive Engineers (SAE) international fuels and lubricants meeting and exposition; San Francisco, CA (United States); 19-22 Oct 1992)			
1	17:31159	*See* UCRL-JC–110069			
CONF-921036–		(182. meeting of the Electrochemical Society; Toronto (Canada); 11-16 Oct 1992)			
5	17:31219	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019283	MF-114
CONF-921048–		(Human Factors Society (HFS) annual meeting; Atlanta, GA (United States); 12-16 Oct 1992)			
4	17:30956	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019212	
CONF-921073–		(International Congress on Glass; Madrid (Spain); 4-9 Oct 1992)			
1	17:31279	*See* SAND–92-1342C			
CONF-921083–		(Geothermal resources council meeting; San Diego, CA (United States); 4-7 Oct 1992)			
6	17:30837	*See* LA-UR–92-2189			
CONF-921101–		(Material Research Society fall meeting; Boston, MA (United States); 30 Nov - 5 dec 1992)			
1	17:30754	*See* Y/WM–123			
CONF-921102–		(Joint American Nuclear Society/European Nuclear Society international meeting; Chicago, IL (United States); 15-20 Nov 1992)			
2	17:32352	*See* SLAC-PUB–5829			
3	17:32277	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92015233	MF-500
4	17:31036	*See* WSRC-MS–92-181			
5	17:30963	*See* WSRC-MS–92-180			
6	17:31748	*See* WSRC-MS–92-205			
7	17:30950	*See* WSRC-MS–92-193			
8	17:30916	*See* SAND–92-1200C			
10	17:31355	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017158	MF-906
11	17:30763	*See* WINCO–11844			
12	17:32349	*See* LA-UR–92-1847			
13	17:32350	*See* LA-UR–92-2073			
14	17:32353	*See* Y/DD–564			
15	17:31029	*See* SAND–91-2191C			
16	17:30707	*See* LA-UR–92-2288			
17	17:32339	*See* LA-UR–92-2186			
18	17:30646	*See* SAND–92-1409C			
19	17:32340	*See* LA-UR–92-2309			
9-Extd.Abst.	17:31354	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017133	MF-906
CONF-921104–		(American Institute of Chemical Engineers annual meeting; Miami, FL (United States); 1-6 Nov 1992)			
1	17:31311	OSTI; NTIS; GPO Dep.	E 1.99:	DE92011041	MF-401
2	17:31124	OSTI; NTIS; GPO Dep.	E 1.99:	DE92011675	MF-401
3	17:30659	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019944	MF-401
CONF-921109–		(Fall meeting of The Metallurgical Society; Chicago, IL (United States); 1-5 Nov 1992)			
1	17:31236	*See* LA-UR–92-2510			
CONF-921110–		(Winter annual meeting of the American Society of Mechanical Engineers; Anaheim, CA (United States); 8-13 Nov 1992)			
1	17:31281	*See* UCRL-JC–109631			
2	17:30973	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92008013	MF-406
3	17:31035	*See* WSRC-MS–92-112			
4	17:32392	*See* SAND–92-0216C			
5	17:31033	*See* WSRC-MS–92-046			
6	17:30534	OSTI; NTIS; GPO Dep.	E 1.99:	DE92015846	MF-115
7	17:31034	*See* WSRC-MS–92-047			
8	17:31241	*See* SAND–92-1543C			
9	17:31042	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017817	MF-406
10	17:31129	*See* EGG-M–92026			
11	17:30911	*See* BNL-NUREG–47747			
12	17:31242	*See* SAND–92-1603C			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
13	17:32366	*See* SAND–92-1571C			
14	17:30866	*See* LA-UR–92-2391			
15	17:31386	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018994	MF-350
16	17:30720	*See* SAND–91-2924C			
17	17:31265	*See* ANL/CP–76560			
18	17:30998	*See* BNL–47769			
19	17:30999	*See* BNL–47786			
20	17:31673	*See* UCRL-JC–107758-R1			
22	17:31037	*See* WSRC-MS–92-231			
24	17:31389	*See* EGG-M–92200			
25	17:31282	*See* UCRL-JC–109956			
CONF-921125–		(ACM/IEEE supercomputing conference; Minneapolis, MN (United States); 14-21 Nov 1992)			
1	17:32405	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92011680	MF-420
2	17:32566	*See* UCRL-JC–110011			
3	17:32564	*See* SAND–92-8515C			
4	17:32556	*See* LA-UR–92-1463			
CONF-921142–		(Eastern oil shale symposium; Lexington, KY (United States); 13-15 Nov 1992)			
1	17:30603	*See* UCRL-JC–109386			
CONF-921143–		(American Physical Society (APS) Division of Fluid Dynamics annual meeting; Tallahassee, FL (United States); 23-25 Nov 1992)			
1	17:32062	*See* SAND–92-8491			
CONF-921144–		(9. international conference on ultra-relativistic nucleus-nucleus collisions; Gatlinburg, TN (United States); 11-15 Nov 1992)			
1	17:32278	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92011780	MF-414
CONF-921152–		(International gas research conference; Orlando, FL (United States); 16-19 Nov 1992)			
1	17:31096	OSTI; NTIS; GPO Dep.	E 1.99:	DE92014442	MF-350
CONF-921162–		(Hypervelocity impact symposium; Austin, TX (United States); 17-20 Nov 1992)			
5	17:32562	*See* SAND–91-2907C			
2-Draft	17:32016	*See* SAND–91-2895C-Draft			
CONF-921166–		(Conference on concurrent engineering approaches to materials processing; Chicago, IL (United States); 2 Nov 1992)			
1	17:31231	*See* IS-M–713			
CONF-921172–		(Composites II; Anaheim, CA (United States); 8 Nov 1992)			
1	17:31272	*See* IS-M–714			
CONF-921183–		(8. international conference on TMS beam processing of advanced materials; Chicago, IL (United States); 5 Nov 1992)			
1	17:31406	*See* LA-UR–92-2464			
CONF-921184–		(Workshop on high temperature structural silicides; Gaithersburg, MD (United States); 4-6 Nov 1992)			
1	17:31258	*See* LA-UR–92-313			
CONF-921185–		(1992 artificial neural networks in engineering conference; St. Louis, MO (United States); 15-18 Nov 1992)			
1	17:31628	*See* SAND–92-0579C			
CONF-921186–		(1992 world of neural networks; Houston, TX (United States); 4-7 Nov 1992)			
1	17:31312	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019205	MF-406
CONF-921197–		(14. annual international IEEE in medicine and biology society; Lyon (France); 2-4 Nov 1992)			
1	17:31850	*See* LA-UR–92-2698			
CRN-CPR–					
91-03	17:32376	OSTI; NTIS (US Sales Only); INIS		DE93701369	
91-07	17:31293	OSTI; NTIS (US Sales Only); INIS		DE93701129	
91-09	17:31294	OSTI; NTIS (US Sales Only); INIS		DE93701128	
CRN-HE–					
90-04	17:32071	OSTI; NTIS (US Sales Only); INIS		DE93703447	
91-05	17:32131	OSTI; NTIS (US Sales Only); INIS		DE92570097	
91-06	17:31547	OSTI; NTIS (US Sales Only); INIS		DE92570098	
91-07	17:31548	OSTI; NTIS (US Sales Only); INIS		DE93701127	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CRN-PHTH–					
91-12	17:32214	OSTI; NTIS (US Sales Only); INIS		DE92570099	
91-16	17:32072	OSTI; NTIS (US Sales Only); INIS		DE92570100	
91-19	17:32215	OSTI; NTIS (US Sales Only); INIS		DE93701130	
CRN-PN–					
91-18	17:32279	OSTI; NTIS (US Sales Only); INIS		DE92570101	
91-22	17:32280	OSTI; NTIS (US Sales Only); INIS		DE92570102	
CSNAS–					
0039.	17:31867	*See* CNIC–00454			
0040.	17:31855	*See* CNIC–00456			
0042.	17:31690	*See* CNIC–00484			
0043.	17:31875	*See* CNIC–00490			
0047.	17:31859	*See* CNIC–00520			
0050.	17:30788	*See* CNIC–00529			
CTH-E–					
92-03	17:30860	*See* NUTEK-VIND–92-7			
CTH-IEFT-PP–					
1992-01	17:32406	OSTI; NTIS; INIS		DE92645304	
1992-02	17:32407	OSTI; NTIS; INIS		DE92645305	
1992-03	17:32408	OSTI; NTIS; INIS		DE92645306	
1992-05	17:32409	OSTI; NTIS; INIS		DE92645307	
CTH-RT-R–					
92-4	17:30859	*See* NUTEK-VIND–92-4			
CTP-TAMU–					
26/91.	17:32076	*See* IC–92/122			
DOE-HDBK–					
1010-92	17:30926	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019784	MF-500
1011/1-92	17:30927	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019785	MF-500
1011/2-92	17:30928	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019786	MF-500
1011/3-92	17:30929	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019787	MF-500
1011/4-92	17:30930	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019788	MF-500
1012/1-92	17:30931	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019789	MF-500
1012/2-92	17:30932	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019790	MF-500
1012/3-92	17:30933	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019791	MF-500
1013/1-92	17:30934	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019792	MF-500
1013/2-92	17:30935	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019793	MF-500
1014/1-92	17:30936	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019794	MF-500
1014/2-92	17:30937	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019795	MF-500
DOE/AD–					
0029	17:32486	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019907	MF-900
0033P	17:32487	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040441	MF-900
DOE/AL/43059–					
T5	17:31151	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018571	MF-336
T6	17:31152	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018570	MF-336
T7	17:31153	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018569	MF-336
T8	17:31154	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018715	MF-336
T9	17:31155	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018576	MF-361
DOE/BC–					
92001062	17:30571	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001062	PC-122
92001066	17:30572	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001066	PC-122
DOE/BC/14250–					
12	17:30566	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040383	MF-123
DOE/BC/14447–					
15	17:30567	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001061	PC-122
DOE/BC/14471–					
12	17:30560	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001065	PC-122
DOE/BC/14476–					
11	17:30561	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92018912	MF-122
DOE/BC/14600–					
32	17:30568	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001067	PC-122
33	17:30569	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001059	PC-122
DOE/BC/14660–					
T1	17:30570	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019817	MF-122
DOE/BP–					
1863	17:31694	*See* DOE/EA–0733			
DOE/BP/07103–					
2	17:31750	OSTi; NTIS; GPO Dep.	E 1.99:	DE92040059	MF-902
DOE/BP/12031–					
1	17:30817	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040058	MF-902
DOE/BP/16475–					
2	17:30818	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040057	MF-902

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
DOE/BP/38906–					
1	17:30819	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040082	MF-902
DOE/CE–					
0358P	17:31220	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019275	PC-312; PC-313
92019969	17:31126	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019969	MF-312; MF-313
92019970	17:31127	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019970	MF-312; MF-313
DOE/CE/15440–					
T5	17:31125	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018709	MF-310
DOE/CE/15525–					
T3	17:31097	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018682	MF-310
DOE/CH–					
9216	17:31061	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019279	MF-900
DOE/CH/10093–					
107	17:31146	OSTI; NTIS; GPO Dep.	E 1.99:	DE91002184	MF-350
135	17:31128	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001227	MF-310; MF-314
147	17:30793	OSTI; NTIS; GPO Dep.	E 1.99:	DE92010556	MF-233
149	17:31064	OSTI; NTIS; GPO Dep.	E 1.99:	DE92010586	MF-350
152	17:30801	OSTI; NTIS; GPO Dep.	E 1.99:	DE92010590	MF-233; MF-234; MF-247
DOE/DP–					
0097T	17:31193	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019753	PC-700
DOE/EA–					
0210	17:30660	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE90006500	MF-630
0615	17:31693	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019443	MF-700; MF-630
0733	17:31694	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018403	MF-630
DOE/EH–					
0254	17:32488	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019100	MF-630
0257P	17:30758	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019091	MF-600
0271	17:31051	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019387	MF-630
231/004/0191(6/92)	17:30661	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019847	MF-630
DOE/EIA–					
0109(92/07)	17:31072	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92019074	MF-950
0109(92/08)	17:30576	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92040700	MF-950
0130(92/07)	17:30594	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018929	MF-950
0202(92/3Q)	17:31066	OSTI; NTIS; INIS; GPO; GPO Dep.	E 1.99:	DE92019683	MF-950
0380(92/08)	17:30577	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92019675	MF-950
0520(92/07)	17:31073	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92019389	MF-950
0555(92)/3	17:31075	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92019510	MF-950
DOE/EM–					
0075	17:31065	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018952	MF-920
0080T	17:30662	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019798	MF-902
DOE/ER–					
0544P	17:31766	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040485	MF-408
0557T	17:32008	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040642	MF-400
0558T	17:32480	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040442	MF-400
DOE/ER/00038–					
3516	17:31324	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019518	MF-401
DOE/ER/03948–					
19	17:32155	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018400	MF-414
DOE/ER/12819–					
T2	17:30957	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019527	MF-405
DOE/ER/12900–					
3	17:31005	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018548	MF-406
DOE/ER/13181–					
T3	17:31295	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92019012	MF-401
DOE/ER/13505–					
3	17:30797	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040181	MF-408
DOE/ER/13519–					
6	17:32357	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019512	MF-411
DOE/ER/13551–					
T1	17:31313	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019522	MF-401
DOE/ER/13622–					
T2	17:31314	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040359	MF-404
DOE/ER/13636–					
T2	17:30562	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040159	MF-403

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
DOE/ER/13727–					
T2	17:32410	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018558	MF-406
DOE/ER/13728–					
4	17:31344	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018716	MF-406
DOE/ER/13771–					
1	17:31645	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019050	MF-403; MF-408
DOE/ER/13772–					
5	17:31315	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019745	MF-401
DOE/ER/14145–					
T1	17:32358	OSTI; NTIS; INIS; GPO; GPO Dep.	E 1.99:	DE92018927	MF-411
DOE/ER/14147–					
2	17:31387	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019459	MF-406
DOE/ER/14205–					
1	17:31323	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019813	MF-410
DOE/ER/14220–					
1	17:31221	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040341	MF-404
DOE/ER/25027–					
6	17:31345	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018551	MF-406
DOE/ER/25065–					
3	17:32073	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019292	MF-405
DOE/ER/40231–					
T12	17:32066	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018550	MF-414
DOE/ER/40270–					
36	17:32205	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040011	MF-413
DOE/ER/40315–					
195	17:32067	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040008	MF-413
DOE/ER/40335–					
13	17:32206	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019286	MF-413
DOE/ER/40531–					
3	17:32281	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019364	MF-413
DOE/ER/40553–					
3	17:32246	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019519	MF-413
DOE/ER/40561–					
68	17:32207	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040079	MF-414
68-INT92	17:32208	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040064	MF-413
DOE/ER/40605–					
2	17:32068	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019746	MF-414
DOE/ER/40661–					
3	17:32069	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040458	MF-414
DOE/ER/40697–					
1	17:31549	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019240	MF-414
DOE/ER/45167–					
T2	17:31255	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92016835	MF-404
DOE/ER/45320–					
5	17:31222	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019517	MF-404
DOE/ER/45401–					
3	17:31270	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019744	MF-401
DOE/ER/45415–					
3	17:32355	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040065	MF-410
DOE/ER/52149–					
4	17:32393	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019516	MF-406
DOE/ER/53198–					
201	17:32411	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041013	PC-426
202	17:32412	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041012	PC-426
203	17:32413	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041011	PC-426
DOE/ER/53223–					
180	17:32414	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019960	MF-420
194	17:32415	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019982	MF-420
DOE/ER/53225–					
T3	17:32416	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019203	MF-420
DOE/ER/53279–					
2	17:32417	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019507	MF-400
DOE/ER/53280–					
6	17:32448	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018557	MF-420
DOE/ER/60503–					
352	17:31760	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019916	MF-411
353	17:31761	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019917	MF-411
DOE/ER/60600–					
1	17:31775	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040178	MF-408
2	17:31910	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040179	MF-408

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
DOE/ER/60627–					
4	17:31695	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019172	MF-403
DOE/ER/60725–					
1	17:31776	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040343	MF-408
DOE/ER/60846–					
3	17:31751	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018800	MF-402
DOE/ER/60894–					
3	17:31777	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019913	MF-408
4	17:31778	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019915	MF-408
DOE/ER/60951–					
3	17:31911	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019846	MF-407
DOE/ER/61006–					
T1	17:31331	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019525	MF-407
DOE/ER/61029–					
9	17:31912	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019169	MF-402
DOE/ER/61215–					
1	17:32515	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019457	MF-403
DOE/ER/61242–					
2	17:31767	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016096	MF-408
DOE/ER/69027–					
3	17:31646	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018648	MF-402
DOE/ER/75360–					
4	17:30974	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019513	MF-400
DOE/ER/75603–					
1	17:32481	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019141	MF-400
DOE/ER/75657–					
1	17:32482	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019456	MF-400
DOE/ER/80910–					
92/C0058	17:31080	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019981	MF-110
DOE/ER/81156–					
92/C0059	17:31081	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019980	MF-110
DOE/ET/15601–					
42	17:31077	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019511	MF-112
DOE/ET/53088–					
556	17:32418	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019393	MF-420
560	17:32419	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019395	MF-426
561	17:32420	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019394	MF-426
562	17:32050	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019396	MF-426
565	17:32421	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019876	MF-420
DOE/FE–					
0242P(12/91)	17:30420	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040428	MF-101
DOE/ID–					
10382-App.A-F	17:30663	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019702	MF-940
22102	17:31752	OSTI; US Geological Survey, Books and Open-File Reports Section, Box 25425, Federal Center, Denver, CO 80225		TI92017831	MF-502
DOE/ID/12781–					
2	17:31256	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019304	MF-310
DOE/ID/12934–					
1	17:30846	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040148	MF-252
2	17:30847	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040147	MF-252
3	17:30848	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040146	MF-252
4	17:30849	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040145	MF-252
DOE/IG–					
92019402	17:30664	OSTI (Free of Charge)		TI92019402	PC-960
92019403	17:30651	OSTI (Free of Charge)		TI92019403	PC-960
92040423	17:30583	OSTI (Free of Charge)		TI92040423	PC-960
92040424	17:31046	OSTI (Free of Charge)		TI92040424	PC-960
92040425	17:31047	OSTI (Free of Charge)		TI92040425	PC-960
DOE/LLW–					
111-Draft	17:30665	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018815	MF-940
141	17:30666	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019892	MF-902
146	17:30667	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019893	MF-902
DOE/MC/11076–					
92/C0041	17:30421	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019176	MF-109
DOE/MC/11089–					
3094-Vol.1	17:30599	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001283	PC-123
3094-Vol.2	17:30600	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001284	PC-123
DOE/MC/23286–					
3093	17:30435	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001281	MF-109

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
DOE/MC/24221–					
92/C0056	17:31082	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019979	MF-110
DOE/MC/25137–					
3088	17:30543	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001274	PC-103
DOE/MC/25167–					
2986	17:31083	OSTI; NTIS; GPO Dep.	E 1.99:	DE91002066	PC-110
DOE/MC/26026–					
C0042	17:30588	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019175	MF-132
DOE/MC/26343–					
3084	17:30589	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001270	PC-132
DOE/MC/26364–					
3101	17:31296	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001296	PC-109
DOE/MC/27168–					
92/C0051	17:31084	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019976	MF-110
DOE/MC/27225–					
T5	17:30436	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017673	MF-108
DOE/MC/27394–					
92/C0050	17:31085	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019973	MF-110
DOE/METC/C–					
92/7023	17:30590	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019681	MF-132
92/7024	17:30591	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019682	MF-132
DOE/NBM–					
92001256	17:31223	OSTI; NTIS; GPO Dep.	E 1.99:	DE92001256	PC-103
DOE/NV/10418–					
3	17:31186	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019410	MF-333
DOE/NV/10576–					
T4	17:30668	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019014	MF-814
T5	17:30669	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019615	MF-814
DOE/OR–					
1047-D1	17:30670	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040322	MF-902
DOE/PC/79924–					
T3	17:31297	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019661	MF-105
DOE/PC/79931–					
T13	17:31086	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040180	MF-110
DOE/PC/88859–					
T12	17:30544	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019207	MF-104
DOE/PC/88923–					
T4	17:30465	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018972	MF-113
T5	17:30466	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018971	MF-113
T6	17:30467	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018970	MF-113
T7	17:30468	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018969	MF-113
T8	17:30469	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018968	MF-113
DOE/PC/88939–					
T3	17:30470	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018094	PC-102
DOE/PC/89661–					
T4	17:30545	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040003	MF-105
T5	17:30546	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040002	MF-105
T8	17:30547	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019849	MF-105
DOE/PC/89767–					
T5	17:30437	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018880	MF-113
DOE/PC/89772–					
T12	17:30438	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE92016632	MF-113
DOE/PC/89773–					
T1	17:30439	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019523	MF-104
T2	17:30440	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019524	MF-104
DOE/PC/89778–					
T1	17:30476	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018324	MF-105
T3	17:30477	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018322	MF-105
T4	17:30478	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018321	MF-105
T5	17:30479	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018320	MF-105
T6	17:30480	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018319	MF-105
T7	17:30481	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018318	MF-105
T8	17:30482	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018317	MF-105
DOE/PC/89782–					
T8	17:31753	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018429	MF-101
DOE/PC/89784–					
11	17:30483	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019855	MF-105
DOE/PC/89857–					
T1	17:30441	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018513	MF-108
T2	17:30442	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018514	MF-108
T4	17:30443	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018512	MF-108

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
T5	17:30444	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018511	MF-108
T6	17:30445	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018510	MF-108
T7	17:30446	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018509	MF-108
DOE/PC/89881–					
T4	17:30447	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019001	MF-113
T5	17:30448	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019002	MF-113
T6	17:30449	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019003	MF-113
T7	17:30450	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019004	MF-113
T8	17:30451	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019005	MF-113
DOE/PC/90005–					
T59	17:30452	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019206	MF-108
DOE/PC/90036–					
T4	17:30453	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018412	MF-108
DOE/PC/90047–					
T4	17:30454	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018872	MF-108
DOE/PC/90182–					
T5	17:30535	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018871	MF-102
DOE/PC/90289–					
T5	17:30455	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019864	MF-108
DOE/PC/90304–					
T2	17:30456	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018679	MF-108
DOE/PC/90306–					
6	17:30425	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019708	MF-102
DOE/PC/90309–					
7	17:30864	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019676	MF-105
DOE/PC/90505–					
T7	17:30548	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019742	MF-104
T8	17:30549	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019743	MF-104
DOE/PC/90546–					
T4	17:30484	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018881	MF-105
DOE/PC/90550–					
T6	17:30865	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019717	MF-105
DOE/PC/91044–					
T1	17:30457	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018707	MF-108
DOE/PC/91292–					
T3	17:30472	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019667	MF-104
DOE/PC/91305–					
2	17:30473	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019665	MF-102
DOE/PC/91308–					
3	17:30550	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019858	MF-104
DOE/PC/91334–					
T47	17:30551	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018362	MF-104
T49	17:30552	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018249	MF-102
T55	17:30426	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018294	MF-102
T57	17:30458	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018296	MF-105
T58	17:30459	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018297	MF-109
DOE/PETC/TR–					
92/11	17:30427	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019276	PC-102
DOE/PR–					
0023	17:32489	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019101	MF-900
DOE/RA/50219–					
21-Pt.1	17:32004	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040152	MF-220
21-Pt.2	17:32005	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040153	MF-220
DOE/RL–					
88-27-Rev.2-Vol.2	17:30671	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019988	MF-721; MF-630
88-27-Rev.2-Vol.3	17:30672	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019989	MF-721; MF-630
88-27-Rev.2-Vol.4	17:30673	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019990	MF-721; MF-630
92-15	17:30779	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019697	MF-630
92-34	17:30674	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019695	MF-510
DOE/RL/11946–					
2-Vol.1	17:30675	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019841	MF-900
2-Vol.3	17:30676	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019843	MF-900
2-Vol.5	17:30677	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019844	MF-900
DOE/RW–					
0184-R1-Vol.1	17:30869	INIS; OSTI (Free of Charge)		TI92019057	PC-810; PC-812; PC-820

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
0184-R1-Vol.2	17:30975	INIS; OSTI (Free of Charge)		TI92019056	PC-810; PC-812; PC-820
0184-R1-Vol.3	17:31332	INIS; OSTI (Free of Charge)		TI92019055	PC-810; PC-812; PC-820
0184-R1-Vol.4	17:30902	INIS; OSTI (Free of Charge)		TI92019054	PC-810; PC-812; PC-820
DOE/SF/16592–					
T1	17:30828	OSTI; NTIS; GPO Dep.	E 1.99:	DE92015946	MF-234
DOE/WIPP–					
92-024	17:30678	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019366	MF-721
DPSP–					
70-1096	17:30976	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019635	MF-700
88-1002-Vol.2	17:31696	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019936	MF-702
DPST–					
72-400	17:31006	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019633	MF-706
DPW–					
5189	17:31224	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92040196	MF-704
6485	17:30977	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019112	MF-700
6512	17:31356	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019113	MF-700
6535	17:31357	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019114	MF-700
6545	17:30958	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019117	MF-700
6546	17:30978	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92018670	MF-700
6643	17:30979	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92018673	MF-700
DTH-LFK-F–					
122-01	17:31098	OSTI; NTIS		DE92562853	
159-01	17:31647	OSTI; NTIS; INIS		DE92562847	
DTH-LV–					
87-24	17:31099	OSTI; NTIS		DE92562852	
87-26	17:31100	OSTI; NTIS		DE92562851	
88-16	17:31101	OSTI; NTIS		DE92562850	
DTH-LV-MEDD–					
201	17:31102	OSTI; NTIS		DE92562856	
202	17:31103	OSTI; NTIS		DE92562855	
223	17:30825	OSTI; NTIS		DE92562846	
225	17:31104	OSTI; NTIS		DE92562857	
226	17:31105	OSTI; NTIS		DE92562858	
229	17:31106	OSTI; NTIS		DE92562854	
DUN–					
2634-RD	17:30980	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92040332	MF-711
4440-RD	17:30981	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019148	MF-711
7038-RD	17:31007	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019149	MF-711
ECN-C–					
91-036	17:32449	OSTI; NTIS; INIS		DE93603009	
91-048	17:30679	OSTI; NTIS; INIS		DE93602339	
91-051	17:30680	OSTI; NTIS; INIS		DE93602340	
91-052	17:30681	OSTI; NTIS; INIS		DE93602341	
91-061	17:30682	OSTI; NTIS; INIS		DE93602343	
91-067	17:32388	OSTI; NTIS; INIS		DE93603143	
91-076	17:31550	OSTI; NTIS; INIS		DE93602314	
91-079	17:30683	OSTI; NTIS; INIS		DE93602345	
92-016	17:30684	OSTI; NTIS; INIS		DE93602346	
ECN-I–					
91-032	17:32450	OSTI; NTIS; INIS		DE93603013	
91-034	17:31225	OSTI; NTIS; INIS		DE93601365	
91-037	17:32451	OSTI; NTIS; INIS		DE93603015	
91-060	17:31226	OSTI; NTIS; INIS		DE93601366	
91-068	17:30982	OSTI; NTIS; INIS		DE93602144	
92-012	17:30983	OSTI; NTIS; INIS		DE93602145	
92-013	17:30685	OSTI; NTIS; INIS		DE93602330	
92-015	17:32516	OSTI; NTIS; INIS		DE93602462	
92-021	17:31847	OSTI; NTIS; INIS		DE93601956	
92-022	17:31848	OSTI; NTIS; INIS		DE93601957	
ECN-RX–					
91-044	17:30959	OSTI; NTIS; INIS		DE93602061	
91-046	17:32282	OSTI; NTIS; INIS		DE93602821	
91-049	17:30940	OSTI; NTIS; INIS		DE93602042	
91-050	17:32216	OSTI; NTIS; INIS		DE93602702	
91-051	17:32283	OSTI; NTIS; INIS		DE93602786	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
91-054	17:32217	OSTI; NTIS; INIS		DE93602703	
91-061	17:32284	OSTI; NTIS; INIS		DE93602787	
91-063	17:32517	OSTI; NTIS; INIS		DE93602463	
91-067	17:32452	OSTI; NTIS; INIS		DE93603021	
91-069	17:31271	OSTI; NTIS; INIS		DE93601403	
91-102	17:32453	OSTI; NTIS; INIS		DE93603022	
91-103	17:31227	OSTI; NTIS; INIS		DE93601351	
91-106	17:30960	OSTI; NTIS; INIS		DE93602062	
91-110	17:30961	OSTI; NTIS; INIS		DE93602063	
92-013	17:32454	OSTI; NTIS; INIS		DE93603006	
EGG–					
10617-2118	17:30579	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92011447	MF-702
2567	17:31024	*See* NUREG/CR–5378			
2655	17:30993	*See* NUREG/CR–5646			
2680	17:31021	*See* NUREG/CR–4391			
EGG-BEG–					
8811	17:31697	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019769	MF-505
EGG-FSP–					
10262	17:32455	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019758	MF-420
10347	17:32456	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019684	MF-420
EGG-GEO–					
10330	17:31698	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019768	MF-902
EGG-M–					
91349	17:31228	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017895	MF-404
91413	17:31008	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017898	
91432	17:31009	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017940	
91449	17:30941	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017885	
91471	17:32518	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017894	MF-905
91505	17:31388	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019763	MF-706
91508	17:32457	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017886	MF-423
92025	17:32007	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017858	MF-907
92026	17:31129	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017850	MF-310
92047	17:30686	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017948	MF-607
92200	17:31389	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019766	MF-706
92261	17:31160	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92017845	
92300	17:31358	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018019	
92340	17:32490	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017852	MF-500
92359	17:30914	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018020	MF-528
92378	17:31390	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017847	MF-310
92451	17:30942	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019761	
EGG-MS–					
10247	17:31010	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019685	MF-706
EGG-NE–					
10289	17:31011	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019686	MF-706
EGG-SSRE–					
9300	17:30759	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018040	MF-507
EGG-WTD–					
10320	17:31648	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019770	MF-902
EPA–					
400R-92-009	17:31041	OSTI; NTIS		DE92019891	
ER–					
13065-586	17:32183	*See* SLAC-PUB–5100			
ER-BC–					
92-03	17:30584	OSTI (Free of Charge)		TI92040943	PC-960
ES/ER/TM–					
33	17:31699	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019010	MF-902
ESG–					
167	17:31465	*See* SLAC-PUB–5742			
ESTSC–					
000171IPCAT01	17:32519	ESTSC			
000190IBMPC01	17:32520	ESTSC			
000208GE63500	17:32521	ESTSC			
000218IBMPC01	17:32522	ESTSC			
000277MNFRM00	17:32523	ESTSC			
000323I037000	17:32524	ESTSC			
000324SUN0000	17:32525	ESTSC			
000324SUN0001	17:32526	ESTSC			
000369MNFRM00	17:32527	ESTSC			
000392C017600	17:32528	ESTSC			
000418C017000	17:32529	ESTSC			
000443I036000	17:32530	RADIATION SHIELDING INFORMATION CENTER			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
000448I037000	17:32531	RADIATION SHIELDING INFORMATION CENTER			
000454C660000	17:32532	RADIATION SHIELDING INFORMATION CENTER			
000454I036000	17:32533	RADIATION SHIELDING INFORMATION CENTER			
000454U110800	17:32534	RADIATION SHIELDING INFORMATION CENTER			
000456U110000	17:32535	RADIATION SHIELDING INFORMATION CENTER			
000457U110000	17:32536	RADIATION SHIELDING INFORMATION CENTER			
000458I037000	17:32537	RADIATION SHIELDING INFORMATION CENTER			
000463C760000	17:32538	ESTSC			
000463I303300	17:32539	ESTSC			
000464I308100	17:32540	ESTSC			
000465I036000	17:32541	RADIATION SHIELDING INFORMATION CENTER			
ESTSC/NRC–					
000102IBMPC00	17:32542	ESTSC			
000106IBMPC00	17:32543	ESTSC			
000109IBMPC00	17:32544	ESTSC			
000125D860000	17:32545	ESTSC			
000360C660000	17:32546	ESTSC			
000360IPS0200	17:32547	ESTSC			
000362DG00000	17:32548	ESTSC			
000362I303300	17:32549	ESTSC			
ETDE/JP-mf–					
92562509	17:30832	OSTI; NTIS (US Sales Only)		DE92562509	
92562517	17:30841	OSTI; NTIS (US Sales Only)		DE92562517	
ETSU-S–					
1163/7	17:30826	OSTI; NTIS (US Sales Only)		DE92565717	
EUR–					
13581	17:30820	OSTI; NTIS (US Sales Only); INIS		TI92566650	
13851	17:30687	OSTI; NTIS (US Sales Only); INIS		TI92566643	
13870/1	17:30688	OSTI; NTIS (US Sales Only); INIS		TI92566651	
13870/2	17:30689	OSTI; NTIS (US Sales Only); INIS		TI92566652	
13870/3	17:30690	OSTI; NTIS (US Sales Only); INIS		TI92566653	
13873	17:30691	OSTI; NTIS (US Sales Only); INIS		TI92566644	
13879	17:30692	OSTI; NTIS (US Sales Only); INIS		TI92566645	
13882	17:30693	OSTI; NTIS (US Sales Only); INIS		TI92566646	
13883	17:30694	OSTI; NTIS (US Sales Only); INIS		TI92566654	
13903	17:30912	OSTI; NTIS (US Sales Only); INIS		TI92566647	
13917	17:30913	OSTI; NTIS (US Sales Only); INIS		TI92566648	
13918	17:30695	OSTI; NTIS (US Sales Only); INIS		TI92566655	
13955	17:30696	OSTI; NTIS (US Sales Only); INIS		TI92566656	
13964	17:30697	OSTI; NTIS (US Sales Only); INIS		TI92566649	
14082	17:30698	OSTI; NTIS (US Sales Only); INIS		TI92566657	
EUR-CEA-FC–					
1442	17:32422	OSTI; NTIS (US Sales Only); INIS		TI92566730	
1443	17:32423	OSTI; NTIS (US Sales Only); INIS		TI92566731	
1444	17:32424	OSTI; NTIS (US Sales Only); INIS		TI92566732	
1445	17:32425	OSTI; NTIS (US Sales Only); INIS		TI92566733	
1446	17:32458	OSTI; NTIS (US Sales Only); INIS		TI92566734	
FASAC-TAR–					
92019706	17:32550	OSTI; Science Applications International Corp., 1710 Goodridge Drive, P.O. Box 1303, McLean, VA 22102		TI92019706	
FEI–					
2103	17:31391	OSTI; NTIS (US Sales Only); INIS		DE92644271	
2110	17:31392	OSTI; NTIS (US Sales Only); INIS		DE92644272	
2139	17:31393	OSTI; NTIS (US Sales Only); INIS		DE92644273	
2155	17:32344	OSTI; NTIS (US Sales Only); INIS		DE92645237	
FEMA-REP–					
17-Rev.1	17:31016	*See* NUREG–1442-Rev.1			
FNAL-TM–					
1784	17:31603	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040439	PC-404; PC-414
FNAL/C–					
92/165	17:32189	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019553	MF-414

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
FRCEA-TH–					
360	17:31551	OSTI; NTIS (US Sales Only); INIS		DE92566708	
361	17:30699	OSTI; NTIS (US Sales Only); INIS		DE93701319	
362	17:30640	OSTI; NTIS (US Sales Only); INIS		DE93701320	
363	17:31333	OSTI; NTIS (US Sales Only); INIS		DE93701321	
FRDIN–					
0004.	17:30951	*See* CNIC–00420			
0005.	17:30785	*See* CNIC–00477			
FRNC-TH–					
3718	17:31615	OSTI; NTIS (US Sales Only)		DE92566582	
3719	17:31257	OSTI; NTIS (US Sales Only); INIS		DE92566642	
GA-A–					
20914	17:32459	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040051	MF-420
20998	17:30903	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018622	MF-522
21007	17:32426	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019639	PC-420
GANIL-A–					
91-02	17:31431	OSTI; NTIS (US Sales Only); INIS		DE92570067	
91-03	17:31432	OSTI; NTIS (US Sales Only); INIS		DE92570068	
91-04	17:31453	OSTI; NTIS (US Sales Only); INIS		DE92570069	
GANIL-P–					
91-16	17:32252	OSTI; NTIS (US Sales Only); INIS		DE92570103	
91-17	17:32132	OSTI; NTIS (US Sales Only); INIS		DE92570070	
91-18	17:32020	OSTI; NTIS (US Sales Only); INIS		DE92570071	
91-19	17:32247	OSTI; NTIS (US Sales Only); INIS		DE92570072	
91-22	17:32218	OSTI; NTIS (US Sales Only); INIS		DE92570104	
91-23	17:32156	OSTI; NTIS (US Sales Only); INIS		DE92570105	
91-24	17:32219	OSTI; NTIS (US Sales Only); INIS		DE93703445	
92-04	17:31484	OSTI; NTIS (US Sales Only); INIS		DE93703437	
92-05	17:32253	OSTI; NTIS (US Sales Only); INIS		DE93703439	
GMR–					
7661	17:31143	*See* SAND–92-1518C			
GSCAN-P–					
86-1A	17:32011	OSTI; NTIS (US Sales Only); INIS		DE92001408	
GSF–					
42/91	17:30700	OSTI; NTIS (US Sales Only); INIS		DE93702448	
GSF-TL–					
38/91	17:30700	*See* GSF–42/91			
GTK-TURVE–					
125	17:30487	OSTI; NTIS		DE92562960	
216	17:30488	OSTI; NTIS		DE92562948	
218	17:30489	OSTI; NTIS		DE92562949	
219	17:30490	OSTI; NTIS		DE92562950	
220	17:30491	OSTI; NTIS		DE92562951	
222	17:30492	OSTI; NTIS		DE92562952	
223	17:30493	OSTI; NTIS		DE92562953	
224	17:30494	OSTI; NTIS		DE92562954	
225	17:30495	OSTI; NTIS		DE92562955	
226	17:30496	OSTI; NTIS		DE92562956	
227	17:30497	OSTI; NTIS		DE92562957	
228	17:30498	OSTI; NTIS		DE92562958	
229	17:30499	OSTI; NTIS		DE92562959	
230	17:30500	OSTI; NTIS		DE92562938	
231	17:30501	OSTI; NTIS		DE92562939	
232	17:30502	OSTI; NTIS		DE92562940	
233	17:30503	OSTI; NTIS		DE92562941	
234	17:30504	OSTI; NTIS		DE92562942	
235	17:30505	OSTI; NTIS		DE92562943	
236	17:30506	OSTI; NTIS		DE92562944	
237	17:30507	OSTI; NTIS		DE92562945	
238	17:30508	OSTI; NTIS		DE92562946	
239	17:30509	OSTI; NTIS		DE92562947	
240	17:30510	OSTI; NTIS		DE92562961	
241	17:30511	OSTI; NTIS		DE92562962	
242	17:30512	OSTI; NTIS		DE92562963	
243	17:30513	OSTI; NTIS		DE92562964	
244	17:30514	OSTI; NTIS		DE92562965	
245	17:30515	OSTI; NTIS		DE92562966	
246	17:30516	OSTI; NTIS		DE92562967	
247	17:30517	OSTI; NTIS		DE92562968	
HCTP–					
04	17:31369	*See* Y/EN–4666			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
HMI-B–					
495	17:31649	OSTI; NTIS (US Sales Only); INIS		DE93702331	
HW–					
12283	17:30984	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019155	MF-501
38375-Del.	17:30985	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019305	MF-500
38808	17:30986	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019174	MF-520
39751-Del.	17:30987	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019307	MF-900
66648	17:30988	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019142	MF-520
69583	17:30989	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019146	MF-711
7405	17:30755	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92018828	MF-700
78039	17:30990	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92018846	MF-510; MF-520
IAAE-CN–					
0029.	17:31689	*See* CNIC–00389			
IAE–					
0067.	17:30881	*See* CNIC–00340			
0067.	17:32506	*See* CNIC–00342			
0068.	17:31606	*See* CNIC–00341			
0071.	17:31602	*See* CNIC–00376			
0073.	17:31544	*See* CNIC–00385			
0074.	17:31266	*See* CNIC–00387			
0075.	17:30783	*See* CNIC–00394			
0076.	17:30638	*See* CNIC–00396			
0083.	17:31292	*See* CNIC–00443			
0087.	17:31546	*See* CNIC–00465			
0088.	17:30971	*See* CNIC–00478			
0088.	17:31607	*See* CNIC–00468			
0089.	17:31856	*See* CNIC–00459			
0090.	17:31329	*See* CNIC–00471			
0091.	17:30887	*See* CNIC–00503			
IAEA-CN–					
56/C-3-1	17:32412	*See* DOE/ER/53198–202			
56/C-3-2	17:32413	*See* DOE/ER/53198–203			
IAEA-INFCIRC–					
254(Rev.1/Pt.2)	17:30766	OSTI; NTIS (US Sales Only); INIS		DE92644641	
IAEA-TECDOC–					
657	17:31860	OSTI; NTIS (US Sales Only); INIS		DE92642251	
659	17:30891	OSTI; NTIS (US Sales Only); INIS		DE93602106	
661	17:30701	OSTI; NTIS (US Sales Only); INIS		DE93602349	
IAPCM–					
0011.	17:31482	*See* CNIC–00373			
0012.	17:31483	*See* CNIC–00374			
0015.	17:32048	*See* CNIC–00400			
0016.	17:31191	*See* CNIC–00401			
0017.	17:31411	*See* CNIC–00448			
IC–					
92/105	17:32075	OSTI; NTIS (US Sales Only); INIS		DE92644713	
92/120	17:31229	OSTI; NTIS (US Sales Only); INIS		DE92643051	
92/122	17:32076	OSTI; NTIS (US Sales Only); INIS		DE92644721	
92/124	17:32077	OSTI; NTIS (US Sales Only); INIS		DE92644722	
92/126	17:32078	OSTI; NTIS (US Sales Only); INIS		DE92644844	
92/127	17:32021	OSTI; NTIS (US Sales Only); INIS		DE92644668	
92/128	17:32022	OSTI; NTIS (US Sales Only); INIS		DE92644669	
92/129	17:32079	OSTI; NTIS (US Sales Only); INIS		DE92644723	
92/130	17:32023	OSTI; NTIS (US Sales Only); INIS		DE92644670	
92/131	17:32080	OSTI; NTIS (US Sales Only); INIS		DE92644724	
92/132	17:32081	OSTI; NTIS (US Sales Only); INIS		DE93602505	
92/133	17:32082	OSTI; NTIS (US Sales Only); INIS		DE92644725	
92/134	17:32083	OSTI; NTIS (US Sales Only); INIS		DE92644714	
92/135	17:32084	OSTI; NTIS (US Sales Only); INIS		DE92644726	
92/136	17:32389	OSTI; NTIS (US Sales Only); INIS		DE92645691	
92/137	17:32133	OSTI; NTIS (US Sales Only); INIS		DE92644888	
92/138	17:32085	OSTI; NTIS (US Sales Only); INIS		DE92644727	
92/139	17:32134	OSTI; NTIS (US Sales Only); INIS		DE92644913	
92/140	17:32086	OSTI; NTIS (US Sales Only); INIS		DE92644845	
92/141	17:32087	OSTI; NTIS (US Sales Only); INIS		DE92644715	
92/144	17:32088	OSTI; NTIS (US Sales Only); INIS		DE92644728	
92/145	17:32089	OSTI; NTIS (US Sales Only); INIS		DE92644729	
92/149	17:32090	OSTI; NTIS (US Sales Only); INIS		DE92644730	
92/152	17:32362	OSTI; NTIS (US Sales Only); INIS		DE92645303	
92/166	17:32157	OSTI; NTIS (US Sales Only); INIS		DE92644960	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
92/167	17:32190	OSTI; NTIS (US Sales Only); INIS		DE92645054	
92/95	17:32074	OSTI; NTIS (US Sales Only); INIS		DE92644731	
IEE–					
IC91	17:31052	OSTI; NTIS		DE92562525	
SR-233	17:31130	OSTI; NTIS		DE92562529	
SR230	17:31053	OSTI; NTIS		DE92562526	
SR231	17:31054	OSTI; NTIS		DE92562527	
SR232	17:31055	OSTI; NTIS		DE92562528	
SR234	17:31067	OSTI; NTIS		DE92562530	
IFE/KR/E–					
92/005	17:30925	OSTI; NTIS; INIS		DE93602362	
IFP–					
39-411	17:30563	OSTI; NTIS (US Sales Only)		DE92566617	
39-530	17:30573	OSTI; NTIS (US Sales Only)		DE92566618	
39478	17:31316	OSTI; NTIS (US Sales Only); INIS		DE93701323	
IFSR–					
556	17:32418	*See* DOE/ET/53088–556			
560	17:32419	*See* DOE/ET/53088–560			
561	17:32420	*See* DOE/ET/53088–561			
562	17:32050	*See* DOE/ET/53088–562			
565	17:32421	*See* DOE/ET/53088–565			
IFVE-OMVT–					
90-80	17:32091	OSTI; NTIS (US Sales Only); INIS		DE92644869	
IHEP-OTF–					
90-90	17:32092	OSTI; NTIS (US Sales Only); INIS		DE92644732	
91-33	17:32158	OSTI; NTIS (US Sales Only); INIS		DE92644947	
INDC(CPR)–					
019/L.	17:32204	*See* CNIC–00492			
INDC(JPN)–					
152/L	17:32320	*See* JAERI–1325			
154/L	17:32321	*See* JAERI-M–92-020			
156/L	17:32322	*See* JAERI-M–92-029			
158/L	17:32211	*See* JAERI-M–92-039			
159/L	17:32462	*See* JAERI-M–92-053			
INFO–					
0417-1	17:31922	OSTI; NTIS (US Sales Only); INIS		DE92644040	
INIS-BR–					
2924	17:31864	OSTI; NTIS (US Sales Only); INIS		DE93000804	
2931	17:30595	OSTI; NTIS (US Sales Only); INIS		DE92001405	
INIS-JP–					
007	17:30789	OSTI; NTIS; INIS		DE93703820	
INIS-mf–					
13215	17:31924	OSTI; NTIS (US Sales Only); INIS		DE92644105	
13331	17:32012	OSTI; NTIS (US Sales Only); INIS		DE92001406	
13333	17:32013	OSTI; NTIS (US Sales Only); INIS		DE92001407	
13336	17:32372	OSTI; NTIS (US Sales Only); INIS		DE92642678	
13337	17:30905	OSTI; NTIS (US Sales Only); INIS		DE93602118	
13338	17:30906	OSTI; NTIS (US Sales Only); INIS		DE93602119	
13341	17:30908	OSTI; NTIS (US Sales Only); INIS		DE93602120	
13342	17:30909	OSTI; NTIS (US Sales Only); INIS		DE93602127	
13346	17:30767	OSTI; NTIS (US Sales Only); INIS		DE93602454	
13347	17:30608	OSTI; NTIS (US Sales Only); INIS		DE92643901	
13350	17:31403	OSTI; NTIS (US Sales Only); INIS		DE93602036	
13351	17:31230	OSTI; NTIS (US Sales Only); INIS		DE93601352	
13352	17:30892	OSTI; NTIS (US Sales Only); INIS		DE93602108	
13353	17:30485	OSTI; NTIS (US Sales Only); INIS		DE93601858	
13354	17:31865	OSTI; NTIS (US Sales Only); INIS		DE93601708	
13355	17:31866	OSTI; NTIS (US Sales Only); INIS		DE93601653	
14055	17:31298	OSTI; NTIS (US Sales Only); INIS		DE93702130	
14060	17:32491	OSTI; NTIS (US Sales Only); INIS		DE93702170	
14064	17:30641	OSTI; NTIS (US Sales Only); INIS		DE93702329	
14069	17:32285	OSTI; NTIS (US Sales Only); INIS		DE92557961	
14071	17:31048	OSTI; NTIS (US Sales Only); INIS		DE93702566	
14080	17:30870	OSTI; NTIS (US Sales Only); INIS		DE93702242	
14081	17:31299	OSTI; NTIS (US Sales Only); INIS		DE93702060	
14082	17:31658	OSTI; NTIS (US Sales Only); INIS		DE93702338	
INP–					
1487	17:32209	OSTI; NTIS (US Sales Only); INIS		DE92645067	
INP-MSU–					
90-34-180	17:32345	OSTI; NTIS (US Sales Only); INIS		DE92645250	
90-56-202	17:32096	OSTI; NTIS (US Sales Only); INIS		DE92644716	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
90-58-204	17:32427	OSTI; NTIS (US Sales Only); INIS		DE92645357	
91-10-214	17:32097	OSTI; NTIS (US Sales Only); INIS		DE92644717	
91-11-215	17:32098	OSTI; NTIS (US Sales Only); INIS		DE92644733	
91-15-219	17:32099	OSTI; NTIS (US Sales Only); INIS		DE92644734	
IPEN-PUB–					
361	17:31853	OSTI; NTIS (US Sales Only); INIS		DE92640589	
IPNO–					
1990/1	17:32259	OSTI; NTIS (US Sales Only); INIS		DE92570037	
IPNO-DRE–					
91-10	17:32248	OSTI; NTIS (US Sales Only); INIS		DE92570058	
91-13	17:32313	OSTI; NTIS (US Sales Only); INIS; Submitted to Z. Phys., A (DE)		DE92570059	
91-16	17:32377	OSTI; NTIS (US Sales Only); INIS		DE92570060	
91-17	17:32314	OSTI; NTIS (US Sales Only); INIS		DE92570061	
91-18	17:32315	OSTI; NTIS (US Sales Only); INIS		DE92570062	
91-19	17:32378	OSTI; NTIS (US Sales Only); INIS		DE92570063	
91-20	17:32316	OSTI; NTIS (US Sales Only); INIS		DE92570064	
91-22	17:32162	OSTI; NTIS (US Sales Only); INIS		DE92570107	
91-23	17:32228	OSTI; NTIS (US Sales Only); INIS		DE92570065	
91-24	17:32317	OSTI; NTIS (US Sales Only); INIS		DE92570066	
91/11	17:31433	OSTI; NTIS (US Sales Only); INIS		DE92570106	
IPNO-TH–					
90-73	17:32229	OSTI; NTIS (US Sales Only); INIS		DE92570073	
90-84	17:32024	OSTI; NTIS (US Sales Only); INIS		DE92570074	
91-07	17:32025	OSTI; NTIS (US Sales Only); INIS		DE92570108	
91-10	17:32318	OSTI; NTIS (US Sales Only); INIS		DE92570075	
91-14	17:32230	OSTI; NTIS (US Sales Only); INIS		DE92570076	
91-15	17:32163	OSTI; NTIS (US Sales Only); INIS		DE92570077	
91-16	17:32026	OSTI; NTIS (US Sales Only); INIS		DE92570109	
91-17	17:32027	OSTI; NTIS (US Sales Only); INIS		DE92570078	
91-20	17:32028	OSTI; NTIS (US Sales Only); INIS		DE92570079	
91-29	17:32193	OSTI; NTIS (US Sales Only); INIS		DE92570080	
91-40	17:32029	OSTI; NTIS (US Sales Only); INIS		DE92570081	
91-41	17:32231	OSTI; NTIS (US Sales Only); INIS		DE92570082	
91-42	17:32354	OSTI; NTIS (US Sales Only); INIS		DE92570083	
91-48	17:32100	OSTI; NTIS (US Sales Only); INIS		DE92570084	
IS–					
5081	17:31404	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018814	MF-400
IS-M–					
713	17:31231	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016299	MF-404
714	17:31272	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016298	MF-404
IS-T–					
1553	17:32014	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018806	MF-403
1606	17:31300	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018805	MF-401
ISN–					
90-59	17:32164	OSTI; NTIS (US Sales Only); INIS		DE93703451	
91-05	17:32268	OSTI; NTIS (US Sales Only); INIS		DE92570110	
91-20	17:32319	OSTI; NTIS (US Sales Only); INIS		DE92570085	
91-28	17:32232	OSTI; NTIS (US Sales Only); INIS		DE92570086	
IVL-B–					
1048	17:31659	OSTI; NTIS		DE92563036	
1056	17:31660	OSTI; NTIS		DE92563088	
1057	17:30812	OSTI; NTIS; INIS		DE92563089	
1061	17:30815	OSTI; NTIS		DE92563090	
Imperial/TP–					
90-91/21	17:32076	*See* IC–92/122			
JAERI–					
1325	17:32320	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92013755	
1326	17:31394	OSTI; NTIS; INIS		DE93703564	
JAERI-M–					
91-214	17:31754	OSTI; NTIS; INIS		DE93703957	
91-216	17:30702	OSTI; NTIS; INIS		DE93703960	
92-011	17:30790	OSTI; NTIS; INIS		DE93703482	
92-015	17:30896	OSTI; NTIS; INIS		DE93703538	
92-017	17:31328	OSTI; NTIS; INIS		DE93703325	
92-020	17:32321	OSTI; NTIS (US Sales Only)		DE92010632	
92-027	17:32210	OSTI; NTIS (US Sales Only)		DE92012612	
92-029	17:32322	OSTI; NTIS (US Sales Only)		DE92012257	
92-039	17:32211	OSTI; NTIS (US Sales Only)		DE92012299	
92-041	17:32460	OSTI; NTIS; INIS		DE93703493	
92-044	17:30953	OSTI; NTIS; INIS		DE93703572	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
92-045	17:32461	OSTI; NTIS; INIS		DE93703496	
92-046	17:30991	OSTI; NTIS; INIS		DE93703535	
92-049	17:30992	OSTI; NTIS; INIS		DE93703542	
92-053	17:32462	OSTI; NTIS (US Sales Only)		DE92015167	
92-056	17:32463	OSTI; NTIS; INIS		DE93703545	
92-057	17:32428	OSTI; NTIS; INIS		DE93703577	
92-058	17:31359	OSTI; NTIS; INIS		DE93703568	
JINR–					
13-91-204	17:31567	OSTI; NTIS (US Sales Only); INIS		DE92644433	
13-91-251	17:31568	OSTI; NTIS (US Sales Only); INIS		DE92644434	
16-90-482	17:31956	OSTI; NTIS (US Sales Only); INIS		DE92644156	
8-90-66	17:31488	OSTI; NTIS (US Sales Only); INIS		DE92644314	
9-91-76	17:31489	OSTI; NTIS (US Sales Only); INIS		DE92644309	
JINR-D–					
1-91-96	17:31531	OSTI; NTIS (US Sales Only); INIS		DE92644326	
13-91-200	17:32429	OSTI; NTIS (US Sales Only); INIS		DE92645358	
15-91-289	17:32430	OSTI; NTIS (US Sales Only); INIS		DE92645359	
15-91-290	17:32431	OSTI; NTIS (US Sales Only); INIS		DE92645360	
19-90-457	17:31959	OSTI; NTIS (US Sales Only); INIS		DE93000803	
6-91-199	17:32249	OSTI; NTIS (US Sales Only); INIS		DE92645115	
JINR-E–					
1-91-146	17:32323	OSTI; NTIS (US Sales Only); INIS		DE92645232	
11-91-108	17:32145	OSTI; NTIS (US Sales Only); INIS		DE93602602	
11-91-353	17:32552	OSTI; NTIS (US Sales Only); INIS		DE92644651	
13-91-175	17:31569	OSTI; NTIS (US Sales Only); INIS		DE92644426	
19-91-334	17:31982	OSTI; NTIS (US Sales Only); INIS		DE92644015	
2-90-587	17:32101	OSTI; NTIS (US Sales Only); INIS		DE92644735	
2-91-114	17:32194	OSTI; NTIS (US Sales Only); INIS		DE92645055	
2-91-115	17:32142	OSTI; NTIS (US Sales Only); INIS		DE92644873	
2-91-118	17:32104	OSTI; NTIS (US Sales Only); INIS		DE92644736	
2-91-150	17:32233	OSTI; NTIS (US Sales Only); INIS		DE92645069	
2-91-157	17:32105	OSTI; NTIS (US Sales Only); INIS		DE92644737	
2-91-171	17:32195	OSTI; NTIS (US Sales Only); INIS		DE93602673	
2-91-180	17:32196	OSTI; NTIS (US Sales Only); INIS		DE92645036	
2-91-183	17:32165	OSTI; NTIS (US Sales Only); INIS		DE92644948	
2-91-184	17:32106	OSTI; NTIS (US Sales Only); INIS		DE92644738	
2-91-195	17:32107	OSTI; NTIS (US Sales Only); INIS		DE92644739	
2-91-253	17:32143	OSTI; NTIS (US Sales Only); INIS		DE92644896	
2-91-260	17:32108	OSTI; NTIS (US Sales Only); INIS		DE92644846	
2-91-262	17:32144	OSTI; NTIS (US Sales Only); INIS		DE93602603	
2-91-266	17:32109	OSTI; NTIS (US Sales Only); INIS		DE92644740	
2-91-272	17:32110	OSTI; NTIS (US Sales Only); INIS		DE92644741	
2-91-281	17:32111	OSTI; NTIS (US Sales Only); INIS		DE92644742	
2-91-296	17:32112	OSTI; NTIS (US Sales Only); INIS		DE92644718	
2-91-77	17:32102	OSTI; NTIS (US Sales Only); INIS		DE92644743	
2-91-78	17:32103	OSTI; NTIS (US Sales Only); INIS		DE92644744	
2-91-92	17:32324	OSTI; NTIS (US Sales Only); INIS		DE92645153	
2-91-97	17:32030	OSTI; NTIS (US Sales Only); INIS		DE92644671	
4-91-106	17:32325	OSTI; NTIS (US Sales Only); INIS		DE92645168	
4-91-126	17:32326	OSTI; NTIS (US Sales Only); INIS		DE92645154	
4-91-132	17:32327	OSTI; NTIS (US Sales Only); INIS		DE92645189	
4-91-169	17:32250	OSTI; NTIS (US Sales Only); INIS		DE92645116	
4-91-213	17:32328	OSTI; NTIS (US Sales Only); INIS		DE92645190	
5-91-174	17:32031	OSTI; NTIS (US Sales Only); INIS		DE92644672	
7-91-149	17:32234	OSTI; NTIS (US Sales Only); INIS		DE93602706	
9-91-156	17:31455	OSTI; NTIS (US Sales Only); INIS		DE92644290	
9-91-178	17:31533	OSTI; NTIS (US Sales Only); INIS		DE92644327	
9-91-293	17:31534	OSTI; NTIS (US Sales Only); INIS		DE92644328	
9-91-51	17:31532	OSTI; NTIS (US Sales Only); INIS		DE92644329	
JINR-N–					
2-48-91	17:31570	OSTI; NTIS (US Sales Only); INIS		DE93000805	
JINR-R–					
1-90-32	17:31573	OSTI; NTIS (US Sales Only); INIS		DE92644429	
1-91-206	17:32331	OSTI; NTIS (US Sales Only); INIS		DE92645191	
1-91-209	17:31575	OSTI; NTIS (US Sales Only); INIS		DE92644430	
1-91-239	17:32332	OSTI; NTIS (US Sales Only); INIS		DE92645178	
1-91-88	17:31574	OSTI; NTIS (US Sales Only); INIS		DE92644431	
10-90-131	17:31412	OSTI; NTIS (US Sales Only); INIS		DE92644545	
10-90-83	17:31577	OSTI; NTIS (US Sales Only); INIS		DE92644432	
10-90-88	17:31616	OSTI; NTIS (US Sales Only); INIS		DE92644546	
10-91-155	17:31578	OSTI; NTIS (US Sales Only); INIS		DE92644404	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
11-90-141	17:31617	OSTI; NTIS (US Sales Only); INIS		DE92644547	
11-90-501	17:32553	OSTI; NTIS (US Sales Only); INIS		DE92644652	
11-91-100	17:32036	OSTI; NTIS (US Sales Only); INIS		DE92644673	
11-91-111	17:32037	OSTI; NTIS (US Sales Only); INIS		DE93602474	
11-91-138	17:32038	OSTI; NTIS (US Sales Only); INIS		DE92644674	
11-91-68	17:32051	OSTI; NTIS (US Sales Only); INIS		DE92643959	
13-91-128	17:31232	OSTI; NTIS (US Sales Only); INIS		DE92643076	
13-91-201	17:31604	OSTI; NTIS (US Sales Only); INIS		DE92644554	
13-91-245	17:31493	OSTI; NTIS (US Sales Only); INIS		DE92644311	
13-91-282	17:31618	OSTI; NTIS (US Sales Only); INIS		DE92644548	
13-91-283	17:31619	OSTI; NTIS (US Sales Only); INIS		DE92644549	
13-91-337	17:31579	OSTI; NTIS (US Sales Only); INIS		DE92644540	
15-91-8	17:32334	OSTI; NTIS (US Sales Only); INIS		DE92645162	
16-91-107	17:32335	OSTI; NTIS (US Sales Only); INIS		DE92645192	
16-91-177	17:32347	OSTI; NTIS (US Sales Only); INIS		DE92645238	
17-91-271	17:32039	OSTI; NTIS (US Sales Only); INIS		DE92644675	
2-91-140	17:32146	OSTI; NTIS (US Sales Only); INIS		DE92644874	
2-91-211	17:32166	OSTI; NTIS (US Sales Only); INIS		DE93602624	
2-91-258	17:32032	OSTI; NTIS (US Sales Only); INIS		DE92644676	
3-91-202	17:32346	OSTI; NTIS (US Sales Only); INIS		DE92645239	
3-91-244	17:32333	OSTI; NTIS (US Sales Only); INIS		DE92645170	
4-91-127	17:32033	OSTI; NTIS (US Sales Only); INIS		DE92644677	
4-91-163	17:32167	OSTI; NTIS (US Sales Only); INIS		DE93602625	
4-91-167	17:32236	OSTI; NTIS (US Sales Only); INIS		DE92645070	
4-91-170	17:32237	OSTI; NTIS (US Sales Only); INIS		DE93602707	
4-91-254	17:32034	OSTI; NTIS (US Sales Only); INIS		DE92644678	
4-91-261	17:32035	OSTI; NTIS (US Sales Only); INIS		DE92644679	
6-91-123	17:31301	OSTI; NTIS (US Sales Only); INIS		DE92642842	
6-91-214	17:31724	OSTI; NTIS (US Sales Only); INIS		DE92643815	
6-91-215	17:31302	OSTI; NTIS (US Sales Only); INIS		DE92642843	
7-91-224	17:31576	OSTI; NTIS (US Sales Only); INIS		DE92644405	
9-90-548	17:31535	OSTI; NTIS (US Sales Only); INIS		DE92644330	
9-90-581	17:31490	OSTI; NTIS (US Sales Only); INIS		DE92644306	
9-91-226	17:31457	OSTI; NTIS (US Sales Only); INIS		DE92644291	
9-91-246	17:31458	OSTI; NTIS (US Sales Only); INIS		DE92644292	
9-91-255	17:31492	OSTI; NTIS (US Sales Only); INIS		DE92644312	
9-91-301	17:31459	OSTI; NTIS (US Sales Only); INIS		DE92644293	
9-91-324	17:31437	OSTI; NTIS (US Sales Only); INIS		DE92644284	
9-91-61	17:31434	OSTI; NTIS (US Sales Only); INIS		DE92644285	
9-91-82	17:31435	OSTI; NTIS (US Sales Only); INIS		DE93602009	
9-91-83	17:31491	OSTI; NTIS (US Sales Only); INIS		DE92644313	
9-91-84	17:31436	OSTI; NTIS (US Sales Only); INIS		DE93602010	
9-91-91	17:31456	OSTI; NTIS (US Sales Only); INIS		DE92644294	
9-91-99	17:31536	OSTI; NTIS (US Sales Only); INIS		DE92644331	
K/CSD/TM–					
101	17:32575	OSTI; NTIS; GPO Dep.	E 1.99:	DE92041242	MF-905
K/ETO–					
93	17:31317	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019277	MF-501
KA–					
92-07	17:32448	*See* DOE/ER/53280–6			
KCP–					
613-4589	17:30703	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019474	PC-702
613-4669	17:31608	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019194	PC-706
613-4679	17:31405	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019193	PC-706
613-4801	17:31131	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019638	PC-706
613-4807	17:31621	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019472	PC-706
613-4809	17:31132	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019470	PC-706
613-4810	17:31622	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019471	PC-706
613-4901	17:31233	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019983	MF-706
613-4972	17:32554	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019469	PC-705
KEK-PR–					
91-2	17:32492	OSTI; NTIS; INIS		DE93704262	
KFK–					
4760	17:31395	OSTI; NTIS (US Sales Only); INIS		DE93702480	
4964	17:31303	OSTI; NTIS (US Sales Only); INIS		DE93702478	
4993	17:32356	OSTI; NTIS (US Sales Only); INIS		DE93702350	
4994	17:31234	OSTI; NTIS (US Sales Only); INIS		DE93702475	
5046	17:32483	OSTI; NTIS (US Sales Only); INIS		DE93702252	
KIYal–					
90-42	17:31983	OSTI; NTIS (US Sales Only); INIS		DE92001409	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
KTH-KRV-R–					
91-7	17:30810	OSTI; NTIS		DE92563039	
KTM/E-B–					
108	17:31107	OSTI; NTIS		DE92562894	
111	17:31089	OSTI; NTIS		DE92562895	
KVM–					
28	17:31643	OSTI; NTIS		DE92563045	
LA–					
12272-MS	17:30704	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019984	MF-940
12341-M	17:32555	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019707	MF-705
12343-MS	17:32269	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019467	MF-413
12348	17:31636	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019962	MF-706
12350	17:31197	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018580	MF-700
12360-T	17:32338	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040323	MF-413
12364	17:31192	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019466	MF-900
LA-UR–					
79-3216	17:30768	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019910	MF-700
92-1463	17:32556	OSTI; NTIS; GPO Dep.	E 1.99:	DE92015211	MF-905
92-1736	17:32201	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017594	MF-413; MF-414
92-1768	17:32202	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017411	MF-413
92-1783	17:31637	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017409	MF-940
92-1805	17:32348	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017408	MF-700
92-1844	17:32390	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017403	MF-904
92-1847	17:32349	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017502	MF-905
92-1901	17:31413	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017517	MF-706
92-1916	17:31360	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017515	
92-1920	17:30705	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017514	MF-721
92-1953	17:31318	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017511	MF-901
92-1978	17:31304	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017508	MF-901
92-1980	17:31638	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017507	MF-900
92-1993	17:32364	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017451	MF-700
92-2039	17:31849	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017448	MF-908
92-2071	17:30706	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018983	MF-940
92-2073	17:32350	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017444	MF-700
92-2083	17:32365	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017442	MF-410
92-2125	17:32052	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018979	MF-700
92-2138	17:32053	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018853	MF-910
92-2158	17:32484	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018896	MF-900
92-2183	17:31133	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018886	MF-401; MF-402
92-2184	17:30769	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018883	MF-900
92-2186	17:32339	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018877	MF-413
92-2189	17:30837	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018876	MF-251
92-2212	17:31661	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018875	MF-402
92-2252	17:30915	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018383	MF-700
92-2268	17:32251	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018373	
92-2288	17:30707	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018287	MF-940
92-2290	17:30770	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040188	MF-700
92-2306	17:30708	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018498	MF-902
92-2309	17:32340	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018922	MF-413
92-2320	17:32361	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018921	MF-410
92-2327	17:30771	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018920	MF-700
92-2331	17:30709	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018918	MF-700
92-2332	17:30760	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018919	MF-700
92-2347	17:30772	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018916	MF-700
92-2355	17:31506	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018988	
92-2378	17:31630	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018874	MF-906
92-2380	17:30844	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018903	MF-250
92-2388	17:31631	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018605	MF-901
92-2390	17:32432	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018604	MF-920
92-2391	17:30866	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018616	
92-2400	17:31235	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018615	MF-404
92-2420	17:31507	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018613	
92-2422	17:31508	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018603	
92-2425	17:31662	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018602	MF-902
92-2431	17:32054	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018601	MF-706
92-2444	17:31259	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018612	MF-364
92-2457	17:32055	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018611	MF-706
92-2464	17:31406	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018608	MF-704; MF-706

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
92-2471	17:32122	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018607	MF-910
92-2489	17:30838	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018999	MF-251
92-2495	17:32056	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018946	MF-910
92-2510	17:31236	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018996	MF-704
92-2536	17:32041	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040389	MF-404
92-2545	17:32057	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040386	MF-910
92-2547	17:32058	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040348	MF-910
92-2548	17:32059	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040349	MF-910
92-2553	17:31509	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040350	
92-2557	17:31273	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040384	MF-901; MF-904
92-2580	17:32557	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040346	MF-414; MF-405
92-2582	17:32464	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040347	MF-712
92-2583	17:31461	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040345	MF-414
92-2603	17:32060	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040344	MF-412
92-2666	17:31510	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040250	
92-2692	17:31511	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040245	
92-2698	17:31850	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040244	MF-708; MF-706
92-2703	17:31512	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040242	
92-2704	17:31513	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040241	
92-2705	17:31514	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040240	
92-2706	17:31515	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040239	
92-2859	17:31305	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040358	MF-701
92-2864	17:32391	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040357	MF-404
92-313	17:31258	OSTI; NTIS; GPO Dep.	E 1.99:	DE92007409	MF-366
LAL–					
91-45	17:32168	OSTI; NTIS (US Sales Only); INIS		DE92570111	
91-47	17:32169	OSTI; NTIS (US Sales Only); INIS		DE92570112	
91-48	17:32197	OSTI; NTIS (US Sales Only); INIS		DE92570113	
91-49	17:32170	OSTI; NTIS (US Sales Only); INIS		DE92570114	
91-61	17:32147	OSTI; NTIS (US Sales Only); INIS		DE92570115	
91-62	17:32171	OSTI; NTIS (US Sales Only); INIS		DE92570116	
91-63	17:32172	OSTI; NTIS (US Sales Only); INIS		DE92570120	
92-06	17:32173	OSTI; NTIS (US Sales Only); INIS		DE93701157	
92-07	17:32174	OSTI; NTIS (US Sales Only); INIS		DE93701158	
92-15	17:32175	OSTI; NTIS (US Sales Only); INIS		DE93701159	
LAL-RT–					
91-08	17:31460	OSTI; NTIS (US Sales Only); INIS		DE92570118	
91-09	17:31504	OSTI; NTIS (US Sales Only); INIS		DE92570119	
91-10	17:31505	OSTI; NTIS (US Sales Only); INIS		DE92570117	
92-04	17:31438	OSTI; NTIS (US Sales Only); INIS		DE93701156	
LAPP-EXP–					
91-05	17:31584	OSTI; NTIS (US Sales Only); INIS		DE93703725	
91-07	17:31585	OSTI; NTIS (US Sales Only); INIS		DE93703729	
91-09	17:32176	OSTI; NTIS (US Sales Only); INIS		DE93703731	
LAPP-TH–					
292/90	17:32113	OSTI; NTIS (US Sales Only); INIS		DE92570087	
314/90	17:32114	OSTI; NTIS (US Sales Only); INIS		DE92570121	
322/90	17:32198	OSTI; NTIS (US Sales Only); INIS		DE92570088	
325/91	17:32115	OSTI; NTIS (US Sales Only); INIS		DE92570089	
326/91	17:32116	OSTI; NTIS (US Sales Only); INIS		DE92570090	
328	17:32117	OSTI; NTIS (US Sales Only); INIS		DE92570122	
329/91	17:32199	OSTI; NTIS (US Sales Only); INIS		DE92570091	
331/91	17:32118	OSTI; NTIS (US Sales Only); INIS		DE92570123	
333/91	17:32148	OSTI; NTIS (US Sales Only); INIS		DE92570092	
337/91	17:32119	OSTI; NTIS (US Sales Only); INIS		DE92570124	
339/91	17:32149	OSTI; NTIS (US Sales Only); INIS		DE92570093	
342/91	17:32120	OSTI; NTIS (US Sales Only); INIS		DE92570094	
343/91	17:32200	OSTI; NTIS (US Sales Only); INIS		DE92570095	
344/91	17:32121	OSTI; NTIS (US Sales Only); INIS		DE93703836	
346/91	17:32150	OSTI; NTIS (US Sales Only); INIS		DE93703829	
350/91	17:32040	OSTI; NTIS (US Sales Only); INIS		DE93703833	
LBL–					
25066	17:32181	*See* SLAC-PUB–4596			
27862	17:32042	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017548	MF-414
31041	17:31516	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016995	MF-406
31888	17:31465	*See* SLAC-PUB–5742			
32305	17:32379	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017012	MF-411
32726	17:31522	*See* SLAC-PUB–5800			

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
LHC-Note–					
181.	17:31519	*See* NIKHEF-H–92-03			
LIU-TEK-LIC–					
1991-41	17:31361	OSTI; NTIS; INIS		DE92644280	
LIYaF–					
90-1605	17:32351	OSTI; NTIS (US Sales Only); INIS		DE92645240	
90-1608	17:32380	OSTI; NTIS (US Sales Only); INIS		DE92645515	
LNS-PH–					
91-15	17:32177	OSTI; NTIS (US Sales Only); INIS		DE92570125	
LPTO–					
05/A/92.	17:32023	*See* IC–92/130			
LUNBDS-NBBE–					
92-1036	17:31725	OSTI; NTIS		DE92563054	
LUTEDX-TEIE–					
5057-1-60-91	17:30824	OSTI; NTIS		DE92563055	
LUTKDH-TKKA–					
7005-1-35-91	17:31134	OSTI; NTIS		DE92563096	
LUTKDH-TKKT–					
1020-1-179-92	17:30867	OSTI; NTIS		DE92563062	
LUTKDH-TKMB–					
1017	17:30802	OSTI; NTIS		DE92563038	
LUTMDN-TMKT–					
5133-1-68-92	17:31135	OSTI; NTIS		DE92563053	
LUTMDN-TMVK–					
5211-1-39-92	17:31108	OSTI; NTIS		DE92563033	
7007-1-106-91	17:31109	OSTI; NTIS		DE92563052	
LUTMDN-TMVS–					
1002	17:31396	OSTI; NTIS		DE92563097	
LYCEN–					
91-21	17:32043	OSTI; NTIS (US Sales Only); INIS		DE92570096	
LYCEN-T–					
9115	17:31586	OSTI; NTIS (US Sales Only); INIS		DE93701125	
9123	17:32341	OSTI; NTIS (US Sales Only); INIS		DE93701126	
MEA–					
2468	17:30878	*See* NUREG/CR–5891			
MF–					
124	17:32414	*See* DOE/ER/53223–180			
MISC–					
91090-Draft	17:30665	*See* DOE/LLW–111-Draft			
MLM–					
3751	17:31274	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040816	PC-704
3755	17:31414	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040815	PC-700
3757(OP)	17:31632	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019340	MF-741
3758(OP)	17:31633	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019337	MF-742
MSHA/IR–					
1203	17:30604	OSTI; NTIS		DE92018652	
NAGRA-NTB–					
91-04.	17:31729	*See* PSI–120			
NAL-TR–					
1117	17:31407	OSTI; NTIS		DE92562500	
1121T	17:31400	OSTI; NTIS		DE92562499	
NDRL–					
3516	17:31324	*See* DOE/ER/00038–3516			
NEANDC(J)–					
163/U	17:32320	*See* JAERI–1325			
NEI-DK–					
900	17:31986	OSTI; NTIS; INIS		DE92644131	
903	17:30857	OSTI; NTIS		DE92562881	
904	17:31056	OSTI; NTIS		DE92562871	
905	17:31120	OSTI; NTIS		DE92562875	
906	17:31121	OSTI; NTIS		DE92562877	
907	17:31122	OSTI; NTIS		DE92562876	
908	17:31147	OSTI; NTIS		DE92562874	
909	17:30845	OSTI; NTIS		DE92562845	
910	17:31663	OSTI; NTIS		DE92562872	
912	17:31110	OSTI; NTIS		DE92562865	
913	17:31111	OSTI; NTIS		DE92562866	
914	17:31112	OSTI; NTIS		DE92562867	
915	17:31408	OSTI; NTIS		DE92562863	
916	17:30858	OSTI; NTIS		DE92562862	
917	17:31664	OSTI; NTIS		DE92562879	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
918	17:30803	OSTI; NTIS; INIS		DE92562880	
919	17:31148	OSTI; NTIS		DE92562864	
920	17:31044	OSTI; NTIS		DE92562873	
NEI-FI–					
165	17:30553	OSTI; NTIS		DE92562896	
166	17:31074	OSTI; NTIS		DE92562897	
167	17:30592	OSTI; NTIS; INIS		DE92562898	
169	17:30863	OSTI; NTIS		DE92562900	
170	17:31136	OSTI; NTIS		DE92562901	
171	17:31113	OSTI; NTIS		DE92562902	
172	17:31137	OSTI; NTIS		DE92562903	
173	17:31114	OSTI; NTIS		DE92562904	
NEI-NO–					
224	17:31851	OSTI; NTIS; INIS		DE92644184	
244	17:31068	OSTI; NTIS		DE92563012	
245	17:31138	OSTI; NTIS		DE92563013	
246	17:30564	OSTI; NTIS		DE92563017	
247	17:31409	OSTI; NTIS		DE92562988	
248	17:30565	OSTI; NTIS		DE92562989	
249	17:30580	OSTI; NTIS; INIS		DE92562992	
250	17:32493	OSTI; NTIS; INIS		DE93602472	
NEI-SE–					
95	17:32494	OSTI; NTIS; INIS		DE92644662	
NERDI–					
0012.	17:30880	*See* CNIC–00331			
0012.	17:30884	*See* CNIC–00362			
0013.	17:30882	*See* CNIC–00343			
0015.	17:31212	*See* CNIC–00411			
0017.	17:30888	*See* CNIC–00512			
NESC–					
1027	17:32538	*See* ESTSC–000463C760000			
1027	17:32539	*See* ESTSC–000463I303300			
147	17:32541	*See* ESTSC–000465I036000			
172	17:32530	*See* ESTSC–000443I036000			
196	17:32537	*See* ESTSC–000458I037000			
279	17:32532	*See* ESTSC–000454C660000			
279	17:32533	*See* ESTSC–000454I036000			
279	17:32534	*See* ESTSC–000454U110800			
515	17:32521	*See* ESTSC–000208GE63500			
642	17:32540	*See* ESTSC–000464I308100			
744	17:32524	*See* ESTSC–000323I037000			
878	17:32531	*See* ESTSC–000448I037000			
886	17:32526	*See* ESTSC–000324SUN0001			
923	17:32536	*See* ESTSC–000457U110000			
924	17:32535	*See* ESTSC–000456U110000			
9426	17:32527	*See* ESTSC–000369MNFRM00			
9625	17:32529	*See* ESTSC–000418C017000			
9671	17:32520	*See* ESTSC–000190IBMPC01			
9717	17:32523	*See* ESTSC–000277MNFRM00			
9826	17:32528	*See* ESTSC–000392C017600			
NFE–					
0001.	17:30634	*See* CNIC–00344			
0003.	17:30954	*See* CNIC–00346			
0004.	17:30883	*See* CNIC–00347			
NIIEFA-P-V–					
0846	17:31517	OSTI; NTIS (US Sales Only); INIS		DE92644315	
0847	17:31518	OSTI; NTIS (US Sales Only); INIS		DE92644310	
NIIYaF-MGU–					
90-34-180.	17:32345	*See* INP-MSU–90-34-180			
90-37-183	17:32178	OSTI; NTIS (US Sales Only); INIS		DE92644949	
90-56-202.	17:32096	*See* INP-MSU–90-56-202			
90-58-204.	17:32427	*See* INP-MSU–90-58-204			
91-10-214.	17:32097	*See* INP-MSU–91-10-214			
91-11-215.	17:32098	*See* INP-MSU–91-11-215			
91-15-219.	17:32099	*See* INP-MSU–91-15-219			
NIKHEF-H–					
92-03	17:31519	OSTI; NTIS; INIS		DE93602017	
92-04	17:32465	OSTI; NTIS; INIS		DE93602998	
92-05	17:32123	OSTI; NTIS; INIS		DE93602500	
92-06	17:32124	OSTI; NTIS; INIS		DE93602555	
92-07	17:32125	OSTI; NTIS; INIS		DE93602506	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
NIKHEF-K-AmPS–					
91-08	17:31520	OSTI; NTIS; INIS		DE93602020	
92-01	17:31462	OSTI; NTIS; INIS		DE93602011	
NINA-R–					
017	17:30581	OSTI; NTIS; INIS		DE92562990	
NIPER–					
617	17:30574	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019703	MF-122; MF-125
NIRS-AR–					
34	17:32495	OSTI; NTIS; INIS		DE93704237	
NRCN(ER)–					
029	17:31665	OSTI; NTIS (US Sales Only); INIS		DE93601535	
NRCN(TE)–					
009	17:30791	OSTI; NTIS (US Sales Only); INIS		DE93601980	
NREL/TP–					
411-4995	17:30821	OSTI; NTIS; GPO Dep.	E 1.99:	DE92010599	MF-271
441-4824	17:31115	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016401	MF-369
451-4938	17:30822	OSTI; NTIS; GPO Dep.	E 1.99:	DE92010588	MF-271
451-4962	17:30823	OSTI; NTIS; GPO Dep.	E 1.99:	DE92010593	MF-271
NU–					
0006.	17:32371	*See* CNIC–00367			
NUI-R–					
5-90	17:31410	OSTI; NTIS		DE92562985	
NUREG–					
0750-Vol.35-No.6	17:30920	OSTI; NTIS; INIS; GPO		TI92040183	
1442-Rev.1	17:31016	OSTI; NTIS; INIS; GPO		TI92019369	
1457	17:31017	OSTI; NTIS; INIS; GPO		TI92018765	
NUREG/CP–					
0120	17:31018	OSTI; NTIS; INIS; GPO		TI92019298	
0124	17:31019	OSTI; NTIS; INIS; GPO		TI92018700	
NUREG/CR–					
3320-Vol.2	17:31020	OSTI; NTIS; INIS; GPO		TI92019025	
4391	17:31021	OSTI; NTIS; INIS; GPO		TI92040315	
4469-Vol.13	17:30921	OSTI; NTIS; INIS; GPO		TI92018945	
4469-Vol.14	17:31022	OSTI; NTIS; INIS		TI92018944	
4819-Vol.2	17:30947	OSTI; NTIS; INIS; GPO		TI92019024	
4832-Vol.3-Pt.2	17:31023	OSTI; NTIS; INIS; GPO		TI92019896	
5378	17:31024	OSTI; NTIS; GPO		TI92019998	
5646	17:30993	OSTI; NTIS; INIS; GPO		TI92018773	
5685	17:30710	OSTI; NTIS; GPO		TI92019210	
5700	17:31025	OSTI; NTIS; INIS; GPO		TI92018591	
5779-Vol.1	17:30877	OSTI; NTIS; INIS; GPO		TI92019022	
5810	17:30904	OSTI; NTIS; INIS; GPO		TI92019605	
5891	17:30878	OSTI; NTIS; INIS; GPO		TI92019994	
6001	17:30962	OSTI; NTIS; INIS; GPO		TI92019438	
6010	17:30897	OSTI; NTIS; INIS; GPO		TI92018775	
NUREG/IA–					
0067	17:31026	OSTI; NTIS; INIS; GPO		TI92019680	
NUTEK-ALTD–					
92-2	17:30585	OSTI; NTIS		DE92563025	
NUTEK-B–					
91-9	17:30795	OSTI; NTIS		DE92563022	
92-2	17:30854	OSTI; NTIS		DE92563024	
92-4	17:31156	OSTI; NTIS		DE92563073	
NUTEK-EO–					
92-1	17:30798	OSTI; NTIS		DE92563019	
92-2	17:30799	OSTI; NTIS		DE92563067	
NUTEK-FBT–					
92-7	17:30808	OSTI; NTIS		DE92563026	
92-8	17:30804	OSTI; NTIS		DE92563027	
92-9	17:30809	OSTI; NTIS		DE92563028	
92-10	17:31666	OSTI; NTIS		DE92563068	
NUTEK-FJV–					
92-1	17:31275	OSTI; NTIS		DE92563020	
NUTEK-KOL–					
92-2	17:30474	OSTI; NTIS		DE92563029	
NUTEK-NGAS–					
92-1	17:30598	OSTI; NTIS		DE92563030	
NUTEK-NYEL–					
92-1	17:31087	OSTI; NTIS		DE92563031	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
NUTEK-R–					
92-8	17:31139	OSTI; NTIS		DE92563074	
92-10	17:30813	OSTI; NTIS; INIS		DE92563018	
NUTEK-SL–					
92-1	17:30831	OSTI; NTIS		DE92563069	
NUTEK-TB–					
92-4	17:30805	OSTI; NTIS		DE92563032	
92-5	17:30806	OSTI; NTIS; INIS		DE92563066	
92-6	17:30811	OSTI; NTIS; INIS		DE92563070	
NUTEK-VIND–					
92-3	17:30855	OSTI; NTIS		DE92563021	
92-4	17:30859	OSTI; NTIS		DE92563071	
92-7	17:30860	OSTI; NTIS		DE92563072	
ORNL–					
6687-Vol.1	17:30877	*See* NUREG/CR–5779-Vol.1			
6715	17:31187	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019064	MF-900
ORNL/ER–					
130	17:31027	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019495	MF-902; MF-940
ORNL/ER/Sub–					
87-99053/50	17:32576	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019492	MF-902; MF-940
92-SK263/1	17:30645	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019278	MF-902
ORNL/M–					
1607	17:30994	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019392	MF-406
1947	17:30642	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019058	MF-523; MF-507
2217-Vol.1	17:30869	*See* DOE/RW–0184-R1-Vol.1			
2217-Vol.2	17:30975	*See* DOE/RW–0184-R1-Vol.2			
2217-Vol.3	17:31332	*See* DOE/RW–0184-R1-Vol.3			
2217-Vol.4	17:30902	*See* DOE/RW–0184-R1-Vol.4			
2265	17:30670	*See* DOE/OR–1047-D1			
ORNL/Sub–					
87-SA946/02	17:31260	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019911	MF-113; MF-114
ORNL/TM–					
11664	17:31049	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019336	
11806	17:31025	*See* NUREG/CR–5700			
11900	17:32558	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019301	MF-405
11977	17:31726	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019061	MF-402
12000	17:30643	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040946	MF-701
12002	17:31642	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019932	
12014	17:30904	*See* NUREG/CR–5810			
12038-Vol.2	17:30947	*See* NUREG/CR–4819-Vol.2			
12075	17:32433	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041363	PC-426
12147	17:32559	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019391	MF-405
12184	17:30792	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041230	MF-413
OUP–					
91-30	17:32126	OSTI; NTIS; INIS		DE92644745	
92-05	17:32127	OSTI; NTIS; INIS		DE92644746	
92-07	17:32238	OSTI; NTIS; INIS		DE92645071	
92-08	17:32270	OSTI; NTIS; INIS		DE92645139	
92-09	17:32496	OSTI; NTIS; INIS		DE92644663	
92-12	17:32179	OSTI; NTIS; INIS		DE93602626	
92-16	17:32180	OSTI; NTIS; INIS		DE93602654	
92-18	17:32044	OSTI; NTIS; INIS		DE93602475	
92-19	17:32560	OSTI; NTIS; INIS		DE93602464	
92-20	17:31598	OSTI; NTIS; INIS		DE93602224	
92-21	17:31599	OSTI; NTIS; INIS		DE93602225	
92-22	17:32239	OSTI; NTIS; INIS		DE93602740	
92-24	17:32045	OSTI; NTIS; INIS		DE93602476	
92-25	17:32046	OSTI; NTIS; INIS		DE93602477	
OY/PSTL-TIED–					
78	17:31667	OSTI; NTIS		DE92562906	
OY/TEK-EL–					
9	17:31140	OSTI; NTIS		DE92562908	
10	17:31116	OSTI; NTIS		DE92562907	
PATENTS-US–					
A7641823	17:31141	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019822	MF-701; MF-706; MF-704

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
A7641832	17:31600	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019837	MF-706
A7641945	17:31276	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019836	MF-506
A7641977	17:31261	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019835	MF-701
A7641978	17:31611	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019834	MF-706
A7642268	17:30807	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019833	MF-246
A7642270	17:30536	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019832	MF-406
A7642577	17:31612	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019831	MF-706
A7642578	17:31262	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019830	MF-504
A7643304	17:31415	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019828	MF-706
A7643305	17:30773	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019827	MF-706
A7643315	17:31439	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019826	MF-706
A7643316	17:31306	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019825	MF-701; MF-706
A7643317	17:31150	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019824	MF-706
A7643320	17:31609	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019840	MF-504
A7645448	17:31613	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019818	MF-404
PNL–					
5711-Vol.13	17:30921	*See* NUREG/CR–4469-Vol.13			
5711-Vol.14	17:31022	*See* NUREG/CR–4469-Vol.14			
7645	17:30711	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019007	MF-940
8020	17:30962	*See* NUREG/CR–6001			
8236	17:31994	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019705	MF-607
PNL-SA–					
19682	17:30948	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019080	MF-504
19945	17:32466	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019372	MF-420
19946	17:31237	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019078	MF-504
19956	17:32467	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019434	MF-423
20275	17:30712	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019105	MF-510
20310	17:31142	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019077	MF-310
20368	17:32006	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019084	MF-408
20410	17:32497	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019433	MF-500
20430	17:30713	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019371	MF-812
20437	17:31762	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019131	MF-506
20440	17:31763	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019123	MF-406
20444	17:31764	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019140	MF-401
20446	17:31765	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019139	MF-406
20453	17:31995	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019076	MF-600
20460	17:30714	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019082	MF-501
20622	17:31727	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019125	MF-902
20626	17:31623	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019124	MF-505
20720	17:31624	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019127	
20742	17:31728	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019085	MF-502
20781	17:31057	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019102	MF-502
20809	17:31668	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019134	MF-402
20943	17:31996	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019104	MF-408
20954	17:31625	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019133	MF-506
20969	17:31117	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019083	MF-350
21006	17:31277	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019138	
21033	17:30715	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019087	MF-940
21038	17:31997	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019086	MF-408
21090	17:31998	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019129	MF-630
21138	17:31307	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019349	MF-902
21150	17:31620	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019350	MF-411
21162	17:31088	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019356	MF-110
21206	17:32015	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019431	MF-408
PNWD–					
1975-HEDR	17:31999	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019950	MF-707
1980-01-HEDR	17:32000	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018914	MF-707
1992-HEDR	17:32001	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018797	MF-707
POEF-T–					
3599	17:31319	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019143	MF-501
PPPL–					
2850	17:32434	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018962	PC-420; PC-426
PPPL-CFP–					
2621	17:32468	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018447	MF-420
2654	17:32435	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018445	MF-420
PSI–					
120	17:31729	OSTI; NTIS; INIS		DE93601467	
123	17:30995	OSTI; NTIS; INIS		DE93602147	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
PSR–					
197	17:32548	*See* ESTSC/NRC–000362DG00000			
197	17:32549	*See* ESTSC/NRC–000362I303300			
PU-NE–					
92/1	17:31387	*See* DOE/ER/14147–2			
Q–					
140	17:31324	*See* DOE/ER/00038–3516			
RCNP-T–					
29	17:31521	OSTI; NTIS; INIS		DE93704288	
30	17:32359	OSTI; NTIS; INIS		DE93704290	
RFP–					
4450	17:31238	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019119	PC-704
4504	17:31362	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019120	PC-714
4581	17:31239	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016864	MF-706
4590	17:32002	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019359	MF-707
4592	17:30762	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019358	MF-700
4604	17:30716	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018620	MF-721
4608	17:31363	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019363	MF-706; MF-705
4614	17:32561	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019357	MF-705
RINPO–					
0008.	17:31267	*See* CNIC–00504			
RISO-M–					
2947	17:31149	OSTI; NTIS		DE92562849	
RISO-R–					
571	17:31730	OSTI; NTIS; INIS		DE92643816	
607	17:32498	OSTI; NTIS; INIS		DE92644664	
611	17:32499	OSTI; NTIS; INIS		DE92644665	
612	17:31050	OSTI; NTIS		DE92562860	
615	17:30861	OSTI; NTIS		DE92562859	
619	17:30898	OSTI; NTIS; INIS		DE92644354	
625	17:32500	OSTI; NTIS; INIS		DE92644686	
RIVM–					
249200001	17:31731	OSTI; NTIS; INIS		DE93601407	
RL-REA–					
922	17:30967	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019151	MF-520
RVF–					
92-2	17:30868	OSTI; NTIS		DE92563034	
SA-FOU–					
91-09	17:30949	OSTI; NTIS; INIS		DE92644343	
SAND–					
85-0004	17:30717	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019324	MF-814
88-0018-Rev.	17:31626	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018931	MF-700
89-2612/Pt.A	17:30586	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE90007948	MF-132
90-0351	17:31639	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040444	MF-706
91-0284	17:32469	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019097	MF-420
91-1222	17:31028	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019461	MF-700
91-1492C	17:31463	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018276	
91-1956	17:30718	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017355	MF-721
91-2191C	17:31029	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018266	MF-904
91-2228	17:30862	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019807	MF-261
91-2322	17:31030	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019323	MF-523
91-2391C	17:32485	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019455	MF-700
91-2592C	17:32374	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019436	MF-701
91-2692	17:31031	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019322	MF-520
91-2768C	17:31627	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018264	MF-706
91-2774C	17:31240	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040096	MF-804
91-2795	17:30719	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019642	MF-814
91-2804C	17:31634	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040942	MF-706
91-2895C-Draft	17:32016	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016791	MF-700
91-2907C	17:32562	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018271	MF-705
91-2924C	17:30720	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018827	MF-902
91-7017	17:30829	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019464	MF-275
91-7070	17:30721	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040647	MF-721
92-0173	17:31018	*See* NUREG/CP–0120			
92-0216C	17:32392	OSTI; NTIS; GPO Dep.	E 1.99:	DE92012624	MF-220
92-0255	17:30899	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019327	
92-0370C	17:32470	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019297	MF-420
92-0472C	17:30774	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92018824	MF-706; MF-722
92-0482	17:31635	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040839	MF-741; MF-701

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
92-0537-Vol.3-Pt.2	17:31023	*See* NUREG/CR–4832-Vol.3-Pt.2			
92-0579C	17:31628	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92017056	
92-0660C	17:31416	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019423	MF-706
92-0661C	17:31417	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019296	MF-706
92-0663C	17:30900	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017426	MF-523
92-0668	17:30830	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019643	MF-236
92-0669C	17:31418	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040093	MF-706
92-0874	17:31045	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019330	MF-700
92-0971C	17:31419	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019427	MF-706
92-1200C	17:30916	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016400	MF-700
92-1226C	17:30722	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017043	MF-814
92-1267C	17:31278	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016944	MF-704
92-1342C	17:31279	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019437	MF-701
92-1391	17:31062	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019468	PC-900
92-1409C	17:30646	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018817	MF-722
92-1501C	17:32061	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016890	MF-706
92-1518C	17:31143	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018269	MF-332
92-1543C	17:31241	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017058	MF-704; MF-706
92-1566C	17:30917	OSTI; NTIS; GPO Dep.	E 1.99:	DE92017418	MF-700
92-1571C	17:32366	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018818	MF-704
92-1580	17:30775	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019460	MF-515
92-1581	17:30647	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019462	MF-515
92-1603C	17:31242	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018283	MF-704
92-1645C	17:30648	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019428	MF-706
92-1648C	17:30587	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019426	MF-132
92-1655C	17:32563	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019421	MF-705
92-1773C	17:31364	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019294	MF-706
92-1775C	17:31640	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019425	MF-706
92-1795C	17:31401	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019435	MF-506
92-1821C	17:31365	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019295	MF-706
92-8491	17:32062	OSTI; NTIS; GPO Dep.	E 1.99:	DE92012153	MF-405
92-8507	17:31157	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018658	MF-310
92-8515C	17:32564	OSTI; NTIS; GPO Dep.	E 1.99:	DE92013565	MF-405
SAPE-CPI–					
8	17:31032	OSTI; NTIS (US Sales Only); INIS		DE92644588	
SCPRI-RM–					
01-1992	17:31669	OSTI; NTIS (US Sales Only); INIS		DE93701136	
02-1992	17:31670	OSTI; NTIS (US Sales Only); INIS		DE93701223	
12-1991	17:30968	OSTI; NTIS (US Sales Only); INIS		DE92566709	
SIB-TN–					
28	17:30827	OSTI; NTIS		DE92563050	
SINRE–					
0023.	17:30952	*See* CNIC–00444			
0024.	17:30886	*See* CNIC–00479			
0026.	17:31379	*See* CNIC–00482			
0028.	17:30786	*See* CNIC–00505			
0030.	17:30787	*See* CNIC–00523			
0031.	17:30972	*See* CNIC–00540			
0032.	17:30889	*See* CNIC–00541			
0033.	17:31214	*See* CNIC–00542			
0034.	17:30890	*See* CNIC–00545			
SIP–					
0039.	17:32397	*See* CNIC–00381			
0041.	17:30885	*See* CNIC–00365			
0043.	17:32383	*See* CNIC–00446			
0044.	17:32508	*See* CNIC–00460			
0045.	17:32401	*See* CNIC–00493			
0046.	17:32386	*See* CNIC–00515			
SKB-TR–					
91-07	17:30756	OSTI; NTIS; INIS		DE92644658	
91-48	17:31732	OSTI; NTIS; INIS		DE92643932	
91-49	17:31733	OSTI; NTIS; INIS		DE92643933	
91-50	17:31755	OSTI; NTIS; INIS		DE92643947	
91-51	17:31734	OSTI; NTIS; INIS		DE92643934	
91-52	17:31735	OSTI; NTIS; INIS		DE92643935	
91-59	17:30723	OSTI; NTIS; INIS		DE92644559	
SLAC-PUB–					
4596	17:32181	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018231	MF-414
4830	17:32182	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019365	MF-414
5100	17:32183	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018151	MF-414

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
5725	17:31464	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019644	MF-414
5733-Rev.	17:32047	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019645	MF-410
5742	17:31465	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019397	MF-414
5800	17:31522	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019646	MF-414
5819	17:32184	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019647	MF-414
5822	17:31523	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040945	MF-414
5829	17:32352	OSTI; NTIS; GPO Dep.	E 1.99:	DE92014837	MF-400
5830	17:31466	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019641	MF-414
5844	17:31440	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019648	MF-414
5848	17:31524	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019649	MF-414
5862	17:31525	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019093	MF-406
5863	17:31526	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019650	MF-414
5864	17:31441	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040944	PC-414
5875	17:31442	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019902	MF-414
SLU-EKON-EX–					
76	17:30811	*See* NUTEK-TB–92-6			
SLU-ST-UPPRLT–					
224	17:30805	*See* NUTEK-TB–92-4			
SLU-VKL-R–					
223	17:30806	*See* NUTEK-TB–92-5			
SMC–					
0048.	17:31854	*See* CNIC–00445			
0051.	17:31868	*See* CNIC–00458			
0052.	17:31869	*See* CNIC–00461			
0053.	17:31870	*See* CNIC–00462			
0054.	17:31857	*See* CNIC–00467			
0055.	17:31871	*See* CNIC–00469			
0056.	17:31872	*See* CNIC–00474			
0057.	17:31873	*See* CNIC–00483			
0058.	17:31874	*See* CNIC–00485			
0059.	17:31876	*See* CNIC–00497			
0060.	17:31877	*See* CNIC–00499			
0063.	17:31858	*See* CNIC–00518			
SMHI-RO–					
14-92	17:31756	OSTI; NTIS		DE92563048	
SMI–					
0004.	17:31213	*See* CNIC–00539			
SNV–					
3944	17:31671	OSTI; NTIS		DE92563059	
3945	17:31672	OSTI; NTIS		DE92563060	
3949	17:31757	OSTI; NTIS; INIS		DE92643948	
3963	17:31758	OSTI; NTIS		DE92563057	
3968	17:30582	OSTI; NTIS; INIS		DE92563058	
3990	17:31736	OSTI; NTIS		DE92563061	
SR/H–					
147	17:30978	*See* DPW–6546			
150	17:30979	*See* DPW–6643			
160	17:30977	*See* DPW–6485			
161	17:31356	*See* DPW–6512			
162	17:31357	*See* DPW–6535			
163	17:30958	*See* DPW–6545			
183	17:31224	*See* DPW–5189			
SSCL–					
428	17:31443	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040646	MF-414
512	17:31467	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040427	PC-414
576	17:31527	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019800	PC-414
578	17:31468	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040645	MF-414
580	17:31469	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040644	MF-414
583	17:31528	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041228	PC-414
SSCL-Preprint–					
123	17:32128	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018101	MF-414
SSCL-SR–					
1213	17:31444	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040055	MF-414
SSY-JULK–					
1/92	17:31118	OSTI; NTIS		DE92562899	
STRIPA-IR–					
91-32	17:31737	OSTI; NTIS; INIS		DE92643936	
STRIPA-TR–					
91-26	17:31738	OSTI; NTIS; INIS		DE92643937	
91-27	17:31739	OSTI; NTIS; INIS		DE92643938	
91-28	17:31740	OSTI; NTIS; INIS		DE92643939	

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
91-29	17:31741	OSTI; NTIS; INIS		DE92643940	
91-30	17:30733	OSTI; NTIS; INIS		DE92644569	
91-31	17:31742	OSTI; NTIS; INIS		DE92643941	
91-35	17:31743	OSTI; NTIS; INIS		DE92643942	
91-36	17:31744	OSTI; NTIS; INIS		DE92643943	
91-37	17:31745	OSTI; NTIS; INIS		DE92643944	
STUDSVIK-EP–					
90-22	17:31666	*See* NUTEK-FBT–92-10			
SUPRI-TR–					
83	17:30569	*See* DOE/BC/14600–33			
86	17:30568	*See* DOE/BC/14600–32			
SV-UB–					
91-69	17:30814	OSTI; NTIS; INIS		DE92563091	
SV-UG–					
92-3	17:31190	OSTI; NTIS		DE92563092	
TKKK-C–					
2/1991	17:31090	OSTI; NTIS		DE92562905	
TRITA-EPP–					
91-02	17:32436	OSTI; NTIS; INIS		DE92645314	
91-05	17:32063	OSTI; NTIS; INIS		DE92643960	
TRITA-KT–					
91-10	17:30804	*See* NUTEK-FBT–92-8			
91-11	17:31087	*See* NUTEK-NYEL–92-1			
TRITA-KUT–					
92-1066	17:31759	OSTI; NTIS; INIS		DE92643950	
TSHUNE–					
0011.	17:31605	*See* CNIC–00337			
0012.	17:30970	*See* CNIC–00363			
0013.	17:31377	*See* CNIC–00406			
0014.	17:31378	*See* CNIC–00416			
0015.	17:31380	*See* CNIC–00487			
0016.	17:31381	*See* CNIC–00489			
0018.	17:30639	*See* CNIC–00509			
0020.	17:30922	*See* CNIC–00516			
0021.	17:30923	*See* CNIC–00517			
TSO–					
92-12	17:31196	*See* BNL–47088			
TVA–					
92019073	17:31144	OSTI; NTIS		DE92019073	
UCID–					
20622-92-1	17:31243	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019905	MF-700
21816	17:32471	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040947	MF-712
UCRL–					
52000-92-4-5	17:31768	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018780	PC-700
53689-91	17:31285	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019751	PC-700
53779-89	17:31746	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018782	PC-403
53868-91	17:31346	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019752	PC-706
UCRL-CR–					
109002	17:31223	*See* DOE/NBM–92001256			
111008	17:31263	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019570	MF-704
111324	17:30460	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019572	MF-109
UCRL-ID–					
107986	17:32472	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019906	MF-712
109684	17:31194	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040426	MF-700
110629	17:31629	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019903	MF-706
111021	17:30734	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018662	MF-703
111352	17:30735	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92041044	MF-721
UCRL-JC–					
103286	17:32473	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019539	MF-712
106562	17:32565	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019601	MF-705
107758-R1	17:31673	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019377	MF-700
107973	17:31420	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018064	MF-706
108710	17:31158	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019580	MF-700
108748	17:31421	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019382	MF-406
108831	17:31280	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019574	MF-701; MF-704
108860	17:32474	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019579	MF-420
108861	17:32475	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019577	MF-420
108867	17:31322	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019501	MF-701
108957	17:31674	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019616	MF-702
109240	17:30602	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019537	MF-123

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
109241	17:30601	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019538	MF-123
109256	17:32476	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019378	MF-712
109386	17:30603	OSTI; NTIS; GPO Dep.	E 1.99:	DE92011531	MF-400
109552	17:32064	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019547	MF-700
109555	17:32477	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019505	MF-712
109563	17:30736	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019506	MF-721
109620	17:30776	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019583	MF-711
109631	17:31281	OSTI; NTIS; GPO Dep.	E 1.99:	DE92008069	MF-403
109645	17:31641	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE92019571	MF-741
109653	17:30737	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019541	MF-721
109697	17:31675	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019617	MF-702
109843	17:31422	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019543	MF-706
109844	17:31423	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019542	MF-706
109845	17:31424	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019576	MF-706
109956	17:31282	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019575	MF-701
109993	17:30738	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019540	MF-701
110011	17:32566	OSTI; NTIS; GPO Dep.	E 1.99:	DE92011972	MF-705
110036	17:32478	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019783	MF-712
110043	17:31425	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019374	MF-712
110069	17:31159	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019504	MF-706
110104	17:30777	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019383	MF-705
110209	17:31426	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019603	MF-706
110324	17:31283	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019546	MF-704
110355	17:31366	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018059	MF-700
110360	17:31244	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019581	MF-700
110364	17:31676	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019376	MF-400
110377	17:31677	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019381	MF-404
110478	17:32479	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019549	MF-712
110481	17:31264	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019548	MF-704
110559	17:31678	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019384	MF-402
110652	17:32367	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019582	MF-704
110859	17:31679	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019385	MF-402
110922-Rev.1	17:30486	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019622	MF-702
111078	17:30778	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019536	MF-700
111089	17:32567	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019602	MF-405
111174	17:31601	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019379	MF-700
UCRL-LR–					
110322	17:31402	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019640	PC-712
UCRL-MA–					
104861-Ver.2-3	17:32065	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040934	MF-706
UR–					
1119	17:32183	*See* SLAC-PUB–5100			
USGS-OFR–					
92-137	17:31747	OSTI; NTIS; INIS; GPO; GPO Dep.	E 1.99:	DE92019280	MF-814
92-91	17:31752	*See* DOE/ID–22102			
WAES-TR–					
92-0004	17:30537	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018093	PC-117
WHC-EP–					
0204-Vol.2	17:31020	*See* NUREG/CR–3320-Vol.2			
0399-Rev.2	17:30739	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040413	MF-600
0514	17:30740	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018162	MF-902
0541	17:30757	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019694	MF-706
WHC-SA–					
1570	17:30649	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019779	MF-900
1584	17:31063	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019778	MF-900
WINCO–					
11509	17:31308	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017464	MF-510
11562	17:30741	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017480	MF-721
11722	17:31309	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017215	MF-510
11730	17:30742	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017220	MF-510
11844	17:30763	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92017277	MF-510
WIS–					
92/49/NOV-PH	17:32128	*See* SSCL-Preprint–123			
WSRC-IM–					
90-83-6-Rev.	17:32568	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019927	MF-705
92-23	17:32569	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019347	MF-705
WSRC-MS–					
92-046	17:31033	OSTI; NTIS; GPO Dep.	E 1.99:	DE92015337	MF-700
92-047	17:31034	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92016711	MF-706
92-112	17:31035	OSTI; NTIS; GPO Dep.	E 1.99:	DE92013079	MF-701
92-180	17:30963	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92015883	MF-700

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
92-181	17:31036	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92015884	MF-704
92-193	17:30950	OSTI; NTIS; GPO Dep.	E 1.99:	DE92016850	MF-707
92-205	17:31748	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92015878	MF-702
92-231	17:31037	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019678	MF-706
92-236	17:31680	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018141	MF-703
92-249	17:32501	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019934	MF-705
92-269	17:30938	OSTI; NTIS; GPO Dep.	E 1.99:	DE92040165	MF-701
92-279	17:30743	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040169	MF-701
92-286	17:30764	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040048	MF-700
WSRC-RD–					
91-24	17:31038	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019931	MF-701
WSRC-RP–					
91-1059	17:31367	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019345	MF-701
91-1151	17:30744	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92040047	MF-706
WSRC-TR–					
90-471	17:30996	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019924	MF-706
92-42-003	17:31039	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019920	MF-706
92-42-011	17:31040	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019933	MF-706
XNIF–					
0002.	17:30955	*See* CNIC–00455			
Y/CSD/INF–					
92/8	17:32570	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018240	MF-705
Y/DD–					
564	17:32353	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92016690	MF-705
Y/EN–					
4325	17:31284	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019489	MF-703; MF-706
4452	17:31368	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019490	MF-703
4666	17:31369	OSTI; NTIS; GPO Dep.	E 1.99:	DE92018361	MF-703
4671/R2	17:31370	OSTI; NTIS; GPO Dep.	E 1.99:	DE92019491	MF-703
Y/ER–					
16	17:30745	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019636	MF-902
17	17:30746	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019630	MF-902
Y/Sub–					
92-99928C/2	17:30753	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92019408	MF-702
Y/WM–					
123	17:30754	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE92018245	MF-721
YJT–					
90-13	17:30747	OSTI; NTIS; INIS		DE93602354	
91-19	17:30748	OSTI; NTIS; INIS		DE93602355	
91-22	17:30749	OSTI; NTIS; INIS		DE93602356	
91-24	17:30750	OSTI; NTIS; INIS		DE93602357	
92-01	17:30751	OSTI; NTIS; INIS		DE93602358	
92-02	17:30752	OSTI; NTIS; INIS		DE93602359	
92-03	17:30879	OSTI; NTIS; INIS		DE93602088	
YMP-A–					
42/1986	17:31681	OSTI; NTIS		DE92562936	
44/1986	17:31682	OSTI; NTIS		DE92562935	
64/1987	17:31683	OSTI; NTIS		DE92562937	
67/1988	17:31058	OSTI; NTIS		DE92562933	
79/1989	17:31069	OSTI; NTIS		DE92562934	

Order Number Correlation

The correlation list is provided for those organizations that file documents by report number but may receive requests by order number. For more information about a document, refer to the Report Number Index.

Order No.	*Report No.*
DE90006500	DOE/EA–0210
DE90007948	SAND–89-2612/Pt.A
DE91002066	DOE/MC/25167–2986
DE91002184	DOE/CH/10093–107
DE91004430	ANL-HEP-CP–90-98
DE91011375	CONF-9106158–1
DE92001059	DOE/BC/14600–33
DE92001061	DOE/BC/14447–15
DE92001062	DOE/BC–92001062
DE92001065	DOE/BC/14471–12
DE92001066	DOE/BC–92001066
DE92001067	DOE/BC/14600–32
DE92001227	DOE/CH/10093–135
DE92001256	DOE/NBM–92001256
DE92001270	DOE/MC/26343–3084
DE92001274	DOE/MC/25137–3088
DE92001281	DOE/MC/23286–3093
DE92001283	DOE/MC/11089–3094-Vol.1
DE92001284	DOE/MC/11089–3094-Vol.2
DE92001292	CONF-920748–14
DE92001296	DOE/MC/26364–3101
DE92001405	INIS-BR–2931
DE92001406	INIS-mf–13331
DE92001407	INIS-mf–13333
DE92001408	GSCAN-P–86-1A
DE92001409	KIYal–90-42
DE92007409	LA-UR–92-313
DE92008013	CONF-921110–2
DE92008069	UCRL-JC–109631
DE92010556	DOE/CH/10093–147
DE92010586	DOE/CH/10093–149
DE92010588	NREL/TP–451-4938
DE92010590	DOE/CH/10093–152
DE92010593	NREL/TP–451-4962
DE92010599	NREL/TP–411-4995
DE92010632	JAERI-M–92-020
DE92011041	CONF-921104–1
DE92011447	EGG–10617-2118
DE92011531	UCRL-JC–109386
DE92011675	CONF-921104–2
DE92011680	CONF-921125–1
DE92011780	CONF-921144–1
DE92011972	UCRL-JC–110011
DE92012153	SAND–92-8491
DE92012257	JAERI-M–92-029
DE92012299	JAERI-M–92-039
DE92012612	JAERI-M–92-027
DE92012624	SAND–92-0216C
DE92013079	WSRC-MS–92-112
DE92013565	SAND–92-8515C
DE92013755	JAERI–1325
DE92014385	CONF-9202108–Summ.
DE92014442	CONF-921152–1
DE92014837	SLAC-PUB–5829
DE92015167	JAERI-M–92-053
DE92015190	ANL/CP–72683
DE92015211	LA-UR–92-1463
DE92015233	CONF-921102–3
DE92015337	WSRC-MS–92-046
DE92015846	CONF-921110–6
DE92015878	WSRC-MS–92-205
DE92015883	WSRC-MS–92-180
DE92015884	WSRC-MS–92-181
DE92015946	DOE/SF/16592–T1
DE92016096	DOE/ER/61242–2
DE92016298	IS-M–714
DE92016299	IS-M–713
DE92016374	CONF-920289–
DE92016400	SAND–92-1200C
DE92016401	NREL/TP–441-4824
DE92016632	DOE/PC/89772–T12
DE92016690	Y/DD–564
DE92016711	WSRC-MS–92-047
DE92016791	SAND–91-2895C-Draft
DE92016835	DOE/ER/45167–T2
DE92016850	WSRC-MS–92-193
DE92016864	RFP–4581
DE92016890	SAND–92-1501C
DE92016944	SAND–92-1267C
DE92016995	LBL–31041
DE92017012	LBL–32305
DE92017043	SAND–92-1226C
DE92017056	SAND–92-0579C
DE92017058	SAND–92-1543C
DE92017133	CONF-921102–9-Extd.Abst.
DE92017158	CONF-921102–10
DE92017215	WINCO–11722
DE92017220	WINCO–11730
DE92017277	WINCO–11844
DE92017355	SAND–91-1956
DE92017403	LA-UR–92-1844
DE92017408	LA-UR–92-1805
DE92017409	LA-UR–92-1783
DE92017411	LA-UR–92-1768
DE92017418	SAND–92-1566C
DE92017426	SAND–92-0663C
DE92017442	LA-UR–92-2083
DE92017444	LA-UR–92-2073
DE92017448	LA-UR–92-2039
DE92017451	LA-UR–92-1993
DE92017464	WINCO–11509
DE92017480	WINCO–11562
DE92017502	LA-UR–92-1847
DE92017507	LA-UR–92-1980
DE92017508	LA-UR–92-1978
DE92017511	LA-UR–92-1953
DE92017514	LA-UR–92-1920
DE92017515	LA-UR–92-1916
DE92017517	LA-UR–92-1901
DE92017548	LBL–27862
DE92017594	LA-UR–92-1736
DE92017673	DOE/MC/27225–T5
DE92017812	CONF-9207124–1
DE92017813	CONF-9209174–1
DE92017817	CONF-921110–9
DE92017823	CONF-9210148–1
DE92017824	CONF-9206234–1
DE92017845	EGG-M–92261
DE92017847	EGG-M–92378
DE92017850	EGG-M–92026
DE92017852	EGG-M–92340
DE92017858	EGG-M–92025
DE92017885	EGG-M–91449
DE92017886	EGG-M–91508
DE92017894	EGG-M–91471
DE92017895	EGG-M–91349
DE92017898	EGG-M–91413
DE92017940	EGG-M–91432
DE92017948	EGG-M–92047
DE92018019	EGG-M–92300
DE92018020	EGG-M–92359
DE92018040	EGG-SSRE–9300
DE92018059	UCRL-JC–110355
DE92018064	UCRL-JC–107973
DE92018093	WAES-TR–92-0004
DE92018094	DOE/PC/88939–T3
DE92018101	SSCL-Preprint–123
DE92018141	WSRC-MS–92-236
DE92018144	BNL-NUREG–47747
DE92018151	SLAC-PUB–5100
DE92018162	WHC-EP–0514
DE92018164	BNL-NUREG–47342
DE92018182	ANL/CP–76582
DE92018183	ANL-HEP-CP–92-47
DE92018184	ANL-HEP-CP–92-46
DE92018185	ANL/CP–76648
DE92018231	SLAC-PUB–4596
DE92018240	Y/CSD/INF–92/8
DE92018245	Y/WM–123
DE92018249	DOE/PC/91334–T49
DE92018250	CONF-9110402–1
DE92018264	SAND–91-2768C
DE92018266	SAND–91-2191C
DE92018269	SAND–92-1518C
DE92018271	SAND–91-2907C
DE92018276	SAND–91-1492C
DE92018283	SAND–92-1603C
DE92018287	LA-UR–92-2288
DE92018294	DOE/PC/91334–T55
DE92018296	DOE/PC/91334–T57
DE92018297	DOE/PC/91334–T58
DE92018317	DOE/PC/89778–T8
DE92018318	DOE/PC/89778–T7
DE92018319	DOE/PC/89778–T6
DE92018320	DOE/PC/89778–T5
DE92018321	DOE/PC/89778–T4
DE92018322	DOE/PC/89778–T3
DE92018324	DOE/PC/89778–T1
DE92018361	Y/EN–4666
DE92018362	DOE/PC/91334–T47
DE92018373	LA-UR–92-2268
DE92018383	LA-UR–92-2252
DE92018400	DOE/ER/03948–19
DE92018403	DOE/EA–0733
DE92018412	DOE/PC/90036–T4
DE92018429	DOE/PC/89782–T8
DE92018445	PPPL-CFP–2654
DE92018447	PPPL-CFP–2621
DE92018491	CONF-9206224–1
DE92018498	LA-UR–92-2306
DE92018500	CONF-920444–32
DE92018509	DOE/PC/89857–T7
DE92018510	DOE/PC/89857–T6

Order No.	Report No.
DE92018511	DOE/PC/89857–T5
DE92018512	DOE/PC/89857–T4
DE92018513	DOE/PC/89857–T1
DE92018514	DOE/PC/89857–T2
DE92018529	CONF-920815–4
DE92018548	DOE/ER/12900–3
DE92018550	DOE/ER/40231–T12
DE92018551	DOE/ER/25027–6
DE92018557	DOE/ER/53280–6
DE92018558	DOE/ER/13727–T2
DE92018569	DOE/AL/43059–T7
DE92018570	DOE/AL/43059–T6
DE92018571	DOE/AL/43059–T5
DE92018576	DOE/AL/43059–T9
DE92018580	LA–12350
DE92018601	LA-UR–92-2431
DE92018602	LA-UR–92-2425
DE92018603	LA-UR–92-2422
DE92018604	LA-UR–92-2390
DE92018605	LA-UR–92-2388
DE92018607	LA-UR–92-2471
DE92018608	LA-UR–92-2464
DE92018611	LA-UR–92-2457
DE92018612	LA-UR–92-2444
DE92018613	LA-UR–92-2420
DE92018615	LA-UR–92-2400
DE92018616	LA-UR–92-2391
DE92018620	RFP–4604
DE92018622	GA-A–20998
DE92018648	DOE/ER/69027–3
DE92018652	MSHA/IR–1203
DE92018658	SAND–92-8507
DE92018662	UCRL-ID–111021
DE92018670	DPW–6546
DE92018673	DPW–6643
DE92018682	DOE/CE/15525–T3
DE92018707	DOE/PC/91044–T1
DE92018709	DOE/CE/15440–T5
DE92018715	DOE/AL/43059–T8
DE92018716	DOE/ER/13728–4
DE92018740	CONF-9210136–2
DE92018756	CONF-920419–Absts.
DE92018766	ANL/CP–76687
DE92018769	ANL/CP–76726
DE92018771	ANL/CP–76749
DE92018772	CONF-920402–49
DE92018777	CONF-9205147–
DE92018780	UCRL–52000-92-4-5
DE92018782	UCRL–53779-89
DE92018787	ANL/CP–76664
DE92018788	ANL/CP–76365
DE92018789	ANL/CP–76673
DE92018790	ANL/CP–74960
DE92018791	ANL/CP–76818
DE92018792	ANL/CP–75257
DE92018793	ANL/CP–76789
DE92018794	ANL/CP–75530
DE92018795	ANL/CP–76805
DE92018797	PNWD–1992-HEDR
DE92018800	DOE/ER/60846–3
DE92018805	IS-T–1606
DE92018806	IS-T–1553
DE92018814	IS–5081
DE92018815	DOE/LLW–111-Draft
DE92018817	SAND–92-1409C
DE92018818	SAND–92-1571C
DE92018824	SAND–92-0472C
DE92018827	SAND–91-2924C
DE92018828	HW–7405
DE92018846	HW–78039
DE92018853	LA-UR–92-2138
DE92018854	CONF-920126–4
DE92018865	CONF-9207117–1
DE92018866	CONF-9209162–1
DE92018871	DOE/PC/90182–T5
DE92018872	DOE/PC/90047–T4
DE92018874	LA-UR–92-2378
DE92018875	LA-UR–92-2212
DE92018876	LA-UR–92-2189
DE92018877	LA-UR–92-2186
DE92018879	DOE/PC/90304–T2
DE92018880	DOE/PC/89767–T5
DE92018881	DOE/PC/90546–T4
DE92018883	LA-UR–92-2184
DE92018886	LA-UR–92-2183
DE92018896	LA-UR–92-2158
DE92018903	LA-UR–92-2380
DE92018912	DOE/BC/14476–11
DE92018914	PNWD–1980-01-HEDR
DE92018916	LA-UR–92-2347
DE92018918	LA-UR–92-2331
DE92018919	LA-UR–92-2332
DE92018920	LA-UR–92-2327
DE92018921	LA-UR–92-2320
DE92018922	LA-UR–92-2309
DE92018926	CONF-9203173–1
DE92018927	DOE/ER/14145–T1
DE92018929	DOE/EIA–0130(92/07)
DE92018931	SAND–88-0018-Rev.
DE92018946	LA-UR–92-2495
DE92018950	CONF-920444–33
DE92018952	DOE/EM–0075
DE92018962	PPPL–2850
DE92018968	DOE/PC/88923–T8
DE92018969	DOE/PC/88923–T7
DE92018970	DOE/PC/88923–T6
DE92018971	DOE/PC/88923–T5
DE92018972	DOE/PC/88923–T4
DE92018979	LA-UR–92-2125
DE92018983	LA-UR–92-2071
DE92018988	LA-UR–92-2355
DE92018994	CONF-921110–15
DE92018996	LA-UR–92-2510
DE92018999	LA-UR–92-2489
DE92019001	DOE/PC/89881–T4
DE92019002	DOE/PC/89881–T5
DE92019003	DOE/PC/89881–T6
DE92019004	DOE/PC/89881–T7
DE92019005	DOE/PC/89881–T8
DE92019007	PNL–7645
DE92019008	BNL–47832
DE92019010	ES/ER/TM–33
DE92019011	CONF-9105126–7
DE92019012	DOE/ER/13181–T3
DE92019014	DOE/NV/10576–T4
DE92019021	CONF-9112129–1
DE92019027	ANL/CP–76665
DE92019028	ANL/CP–76653
DE92019030	ANL/CP–76610
DE92019031	ANL/CP–76715
DE92019036	ANL/CP–76723
DE92019039	ANL/CP–76560
DE92019040	ANL/CP–76649
DE92019041	ANL/CP–76585
DE92019050	DOE/ER/13771–1
DE92019058	ORNL/M–1947
DE92019061	ORNL/TM–11977
DE92019064	ORNL–6715
DE92019073	TVA–92019073
DE92019074	DOE/EIA–0109(92/07)
DE92019076	PNL-SA–20453
DE92019077	PNL-SA–20310
DE92019078	PNL-SA–19946
DE92019080	PNL-SA–19682
DE92019082	PNL-SA–20460
DE92019083	PNL-SA–20969
DE92019084	PNL-SA–20368
DE92019085	PNL-SA–20742
DE92019086	PNL-SA–21038
DE92019087	PNL-SA–21033
DE92019091	DOE/EH–0257P
DE92019093	SLAC-PUB–5862
DE92019097	SAND–91-0284
DE92019100	DOE/EH–0254
DE92019101	DOE/PR–0023
DE92019102	PNL-SA–20781
DE92019104	PNL-SA–20943
DE92019105	PNL-SA–20275
DE92019112	DPW–6485
DE92019113	DPW–6512
DE92019114	DPW–6535
DE92019117	DPW–6545
DE92019118	APA–92019118
DE92019119	RFP–4450
DE92019120	RFP–4504
DE92019123	PNL-SA–20440
DE92019124	PNL-SA–20626
DE92019125	PNL-SA–20622
DE92019127	PNL-SA–20720
DE92019129	PNL-SA–21090
DE92019131	PNL-SA–20437
DE92019133	PNL-SA–20954
DE92019134	PNL-SA–20809
DE92019138	PNL-SA–21006
DE92019139	PNL-SA–20446
DE92019140	PNL-SA–20444
DE92019141	DOE/ER/75603–1
DE92019142	HW–66648
DE92019143	POEF-T–3599
DE92019146	HW–69583
DE92019148	DUN–4440-RD
DE92019149	DUN–7038-RD
DE92019151	RL-REA–922
DE92019153	BNWL-CC–224-Add.
DE92019155	HW–12283
DE92019169	DOE/ER/61029–9
DE92019172	DOE/ER/60627–4
DE92019174	HW–38808
DE92019175	DOE/MC/26026–C0042
DE92019176	DOE/MC/11076–92/C0041
DE92019177	CONF-9205108–12
DE92019180	CONF-920694–2
DE92019181	CONF-9206238–1
DE92019185	CONF-9203164–2
DE92019193	KCP–613-4679
DE92019194	KCP–613-4669
DE92019203	DOE/ER/53225–T3
DE92019205	CONF-921186–1
DE92019206	DOE/PC/90005–T59
DE92019207	DOE/PC/88859–T12
DE92019212	CONF-921048–4
DE92019217	BNL–47813
DE92019218	BNL-NUREG–47818
DE92019219	BNL–47765
DE92019220	BNL–47811
DE92019221	BNL–47266
DE92019234	BNL-NUREG–47766
DE92019236	BNL–47764
DE92019238	BNL–47786
DE92019239	ANL–92/28
DE92019240	DOE/ER/40697–1
DE92019246	BNL–47800
DE92019247	BNL–47784
DE92019248	BNL–47803
DE92019249	BNL–47796
DE92019250	BNL-NUREG–47768

Order No.	Report No.
DE92019251	BNL–47267
DE92019253	BNL–47799
DE92019254	BNL–47769
DE92019255	BNL–47776
DE92019256	BNL–47806
DE92019257	BNL–47814
DE92019258	BNL-NUREG–47809
DE92019259	BNL–47785
DE92019275	DOE/CE–0358P
DE92019276	DOE/PETC/TR–92/11
DE92019277	K/ETO–93
DE92019278	ORNL/ER/Sub–92-SK263/1
DE92019279	DOE/CH–9216
DE92019280	USGS-OFR–92-137
DE92019282	CONF-920808–5
DE92019283	CONF-921036–5
DE92019285	CONF-920448–7
DE92019286	DOE/ER/40335–13
DE92019291	CONF-9207102–49
DE92019292	DOE/ER/25065–3
DE92019294	SAND–92-1773C
DE92019295	SAND–92-1821C
DE92019296	SAND–92-0661C
DE92019297	SAND–92-0370C
DE92019300	ANL–92/31
DE92019301	ORNL/TM–11900
DE92019304	DOE/ID/12781–2
DE92019305	HW–38375-Del.
DE92019307	HW–39751-Del.
DE92019322	SAND–91-2692
DE92019323	SAND–91-2322
DE92019324	SAND–85-0004
DE92019327	SAND–92-0255
DE92019330	SAND–92-0874
DE92019334	ANL/MCS-P–69-0389
DE92019335	ANL/ACL–92/1
DE92019336	ORNL/TM–11664
DE92019337	MLM–3758(OP)
DE92019340	MLM–3757(OP)
DE92019345	WSRC-RP–91-1059
DE92019347	WSRC-IM–92-23
DE92019349	PNL-SA–21138
DE92019350	PNL-SA–21150
DE92019356	PNL-SA–21162
DE92019357	RFP–4614
DE92019358	RFP–4592
DE92019359	RFP–4590
DE92019363	RFP–4608
DE92019364	DOE/ER/40531–3
DE92019365	SLAC-PUB–4830
DE92019366	DOE/WIPP–92-024
DE92019367	BNL–47142
DE92019368	BNL–47156
DE92019371	PNL-SA–20430
DE92019372	PNL-SA–19945
DE92019374	UCRL-JC–110043
DE92019376	UCRL-JC–110364
DE92019377	UCRL-JC–107758-R1
DE92019378	UCRL-JC–109256
DE92019379	UCRL-JC–111174
DE92019381	UCRL-JC–110377
DE92019382	UCRL-JC–108748
DE92019383	UCRL-JC–110104
DE92019384	UCRL-JC–110559
DE92019385	UCRL-JC–110859
DE92019387	DOE/EH–0271
DE92019389	DOE/EIA–0520(92/07)
DE92019391	ORNL/TM–12147
DE92019392	ORNL/M–1607
DE92019393	DOE/ET/53088–556
DE92019394	DOE/ET/53088–561
DE92019395	DOE/ET/53088–560
DE92019396	DOE/ET/53088–562
DE92019397	SLAC-PUB–5742
DE92019408	Y/Sub–92-99928C/2
DE92019410	DOE/NV/10418–3
DE92019411	BNL–47624
DE92019412	BNL–47088
DE92019413	ANL/ACL–92/2
DE92019421	SAND–92-1655C
DE92019423	SAND–92-0660C
DE92019425	SAND–92-1775C
DE92019426	SAND–92-1648C
DE92019427	SAND–92-0971C
DE92019428	SAND–92-1645C
DE92019431	PNL-SA–21206
DE92019433	PNL-SA–20410
DE92019434	PNL-SA–19956
DE92019435	SAND–92-1795C
DE92019436	SAND–91-2592C
DE92019437	SAND–92-1342C
DE92019443	DOE/EA–0615
DE92019451	BNL–47148
DE92019452	BNL–47149
DE92019455	SAND–91-2391C
DE92019456	DOE/ER/75657–1
DE92019457	DOE/ER/61215–1
DE92019459	DOE/ER/14147–2
DE92019460	SAND–92-1580
DE92019461	SAND–91-1222
DE92019462	SAND–92-1581
DE92019464	SAND–91-7017
DE92019466	LA–12364
DE92019467	LA–12343-MS
DE92019468	SAND–92-1391
DE92019469	KCP–613-4972
DE92019470	KCP–613-4809
DE92019471	KCP–613-4810
DE92019472	KCP–613-4807
DE92019473	BDX–613-3417
DE92019474	KCP–613-4589
DE92019483	CONF-9207102–58
DE92019489	Y/EN–4325
DE92019490	Y/EN–4452
DE92019491	Y/EN–4671/R2
DE92019492	ORNL/ER/Sub–87-99053/50
DE92019493	CONF-920913–7
DE92019495	ORNL/ER–130
DE92019497	BNL–45080
DE92019498	BNL–47119
DE92019499	BNL–47103
DE92019500	BNL–47104
DE92019501	UCRL-JC–108867
DE92019504	UCRL-JC–110069
DE92019505	UCRL-JC–109555
DE92019506	UCRL-JC–109563
DE92019507	DOE/ER/53279–2
DE92019510	DOE/EIA–0555(92)/3
DE92019511	DOE/ET/15601–42
DE92019512	DOE/ER/13519–6
DE92019513	DOE/ER/75360–4
DE92019516	DOE/ER/52149–4
DE92019517	DOE/ER/45320–5
DE92019518	DOE/ER/00038–3516
DE92019519	DOE/ER/40553–3
DE92019522	DOE/ER/13551–T1
DE92019523	DOE/PC/89773–T1
DE92019524	DOE/PC/89773–T2
DE92019525	DOE/ER/61006–T1
DE92019527	DOE/ER/12819–T2
DE92019536	UCRL-JC–111078
DE92019537	UCRL-JC–109240
DE92019538	UCRL-JC–109241
DE92019539	UCRL-JC–103286
DE92019540	UCRL-JC–109993
DE92019541	UCRL-JC–109653
DE92019542	UCRL-JC–109844
DE92019543	UCRL-JC–109843
DE92019546	UCRL-JC–110324
DE92019547	UCRL-JC–109552
DE92019548	UCRL-JC–110481
DE92019549	UCRL-JC–110478
DE92019553	FNAL/C–92/165
DE92019554	CONF-920444–35
DE92019555	CONF-920444–34
DE92019570	UCRL-CR–111008
DE92019571	UCRL-JC–109645
DE92019572	UCRL-CR–111324
DE92019574	UCRL-JC–108831
DE92019575	UCRL-JC–109956
DE92019576	UCRL-JC–109845
DE92019577	UCRL-JC–108861
DE92019579	UCRL-JC–108860
DE92019580	UCRL-JC–108710
DE92019581	UCRL-JC–110360
DE92019582	UCRL-JC–110652
DE92019583	UCRL-JC–109620
DE92019584	ANL/CP–74791
DE92019585	ANL/CP–74789
DE92019586	ANL/CP–76480
DE92019587	ANL/CP–74687
DE92019588	ANL/CP–74685
DE92019589	ANL/CP–74717
DE92019590	ANL/CP–75204
DE92019591	ANL/CP–75321
DE92019593	ANL/CP–75064
DE92019594	ANL/CP–76324
DE92019596	ANL/CP–75350
DE92019597	ANL/CP–76698
DE92019598	ANL/CP–76667
DE92019599	ANL/CP–76725
DE92019600	ANL/CP–75688
DE92019601	UCRL-JC–106562
DE92019602	UCRL-JC–111089
DE92019603	UCRL-JC–110209
DE92019615	DOE/NV/10576–T5
DE92019616	UCRL-JC–108957
DE92019617	UCRL-JC–109697
DE92019622	UCRL-JC–110922-Rev.1
DE92019630	Y/ER–17
DE92019633	DPST–72-400
DE92019635	DPSP–70-1096
DE92019636	Y/ER–16
DE92019638	KCP–613-4801
DE92019639	GA-A–21007
DE92019640	UCRL-LR–110322
DE92019641	SLAC-PUB–5830
DE92019642	SAND–91-2795
DE92019643	SAND–92-0668
DE92019644	SLAC-PUB–5725
DE92019645	SLAC-PUB–5733-Rev.
DE92019646	SLAC-PUB–5800
DE92019647	SLAC-PUB–5819
DE92019648	SLAC-PUB–5844
DE92019649	SLAC-PUB–5848
DE92019650	SLAC-PUB–5863
DE92019661	DOE/PC/79924–T3
DE92019670	ANL/CP–76765
DE92019671	ANL/CP–76870
DE92019673	ANL/CP–76821
DE92019674	ANL/CP–76820
DE92019675	DOE/EIA–0380(92/08)
DE92019676	DOE/PC/90309–7
DE92019678	WSRC-MS–92-231
DE92019681	DOE/METC/C–92/7023
DE92019682	DOE/METC/C–92/7024

Order No.	*Report No.*
DE92019683	DOE/EIA–0202(92/3Q)
DE92019684	EGG-FSP–10347
DE92019685	EGG-MS–10247
DE92019686	EGG-NE–10289
DE92019694	WHC-EP–0541
DE92019695	DOE/RL–92-34
DE92019696	ANL/CP–76315
DE92019697	DOE/RL–92-15
DE92019702	DOE/ID–10382-App.A-F
DE92019703	NIPER–617
DE92019705	PNL–8236
DE92019707	LA–12341-M
DE92019708	DOE/PC/90308–6
DE92019717	DOE/PC/90550–T6
DE92019742	DOE/PC/90505–T7
DE92019743	DOE/PC/90505–T8
DE92019744	DOE/ER/45401–3
DE92019745	DOE/ER/13772–5
DE92019746	DOE/ER/40605–2
DE92019751	UCRL–53689-91
DE92019752	UCRL–53868-91
DE92019753	DOE/DP–0097T
DE92019755	CONF-9110236–8
DE92019758	EGG-FSP–10262
DE92019761	EGG-M–92451
DE92019763	EGG-M–91505
DE92019766	EGG-M–92200
DE92019768	EGG-GEO–10330
DE92019769	EGG-BEG–8811
DE92019770	EGG-WTD–10320
DE92019778	WHC-SA–1584
DE92019779	WHC-SA–1570
DE92019783	UCRL-JC–110036
DE92019784	DOE-HDBK–1010-92
DE92019785	DOE-HDBK–1011/1-92
DE92019786	DOE-HDBK–1011/2-92
DE92019787	DOE-HDBK–1011/3-92
DE92019788	DOE-HDBK–1011/4-92
DE92019789	DOE-HDBK–1012/1-92
DE92019790	DOE-HDBK–1012/2-92
DE92019791	DOE-HDBK–1012/3-92
DE92019792	DOE-HDBK–1013/1-92
DE92019793	DOE-HDBK–1013/2-92
DE92019794	DOE-HDBK–1014/1-92
DE92019795	DOE-HDBK–1014/2-92
DE92019798	DOE/EM–0080T
DE92019800	SSCL–576
DE92019807	SAND–91-2228
DE92019813	DOE/ER/14205–1
DE92019817	DOE/BC/14660–T1
DE92019818	PATENTS-US–A7645448
DE92019822	PATENTS-US–A7641823
DE92019824	PATENTS-US–A7643317
DE92019825	PATENTS-US–A7643316
DE92019826	PATENTS-US–A7643315
DE92019827	PATENTS-US–A7643305
DE92019828	PATENTS-US–A7643304
DE92019830	PATENTS-US–A7642578
DE92019831	PATENTS-US–A7642577
DE92019832	PATENTS-US–A7642270
DE92019833	PATENTS-US–A7642268
DE92019834	PATENTS-US–A7641978
DE92019835	PATENTS-US–A7641977
DE92019836	PATENTS-US–A7641945
DE92019837	PATENTS-US–A7641832
DE92019840	PATENTS-US–A7643320
DE92019841	DOE/RL/11946–2-Vol.1
DE92019843	DOE/RL/11946–2-Vol.3
DE92019844	DOE/RL/11946–2-Vol.5
DE92019846	DOE/ER/60951–3
DE92019847	DOE/EH–231/004/0191(6/92)
DE92019849	DOE/PC/89661–T8
DE92019855	DOE/PC/89784–11
DE92019858	DOE/PC/91308–3
DE92019864	DOE/PC/90289–T5
DE92019865	DOE/PC/91305–2
DE92019867	DOE/PC/91292–T3
DE92019876	DOE/ET/53088–565
DE92019891	EPA–400R-92-009
DE92019892	DOE/LLW–141
DE92019893	DOE/LLW–146
DE92019902	SLAC-PUB–5875
DE92019903	UCRL-ID–110629
DE92019905	UCID–20622-92-1
DE92019906	UCRL-ID–107986
DE92019907	DOE/AD–0029
DE92019910	LA-UR–79-3216
DE92019911	ORNL/Sub–87-SA946/02
DE92019913	DOE/ER/60894–3
DE92019915	DOE/ER/60894–4
DE92019916	DOE/ER/60503–352
DE92019917	DOE/ER/60503–353
DE92019920	WSRC-TR–92-42-003
DE92019924	WSRC-TR–90-471
DE92019927	WSRC-IM–90-83-6-Rev.
DE92019931	WSRC-RD–91-24
DE92019932	ORNL/TM–12002
DE92019933	WSRC-TR–92-42-011
DE92019934	WSRC-MS–92-249
DE92019936	DPSP–88-1002-Vol.2
DE92019937	CONF-920721–8
DE92019938	CONF-920721–7
DE92019943	CONF-9209176–1
DE92019944	CONF-921104–3
DE92019945	CONF-9207102–60
DE92019946	CONF-9206254–2
DE92019950	PNWD–1975-HEDR
DE92019951	CONF-9208124–1
DE92019952	CONF-9205236–3
DE92019960	DOE/ER/53223–180
DE92019962	LA–12348
DE92019965	CONF-9209109–2
DE92019969	DOE/CE–92019969
DE92019970	DOE/CE–92019970
DE92019973	DOE/MC/27394–92/C0050
DE92019976	DOE/MC/27168–92/C0051
DE92019979	DOE/MC/24221–92/C0056
DE92019980	DOE/ER/81156–92/C0059
DE92019981	DOE/ER/80910–92/C0058
DE92019982	DOE/ER/53223–194
DE92019983	KCP–613-4901
DE92019984	LA–12272-MS
DE92019988	DOE/RL–88-27-Rev.2-Vol.2
DE92019989	DOE/RL–88-27-Rev.2-Vol.3
DE92019990	DOE/RL–88-27-Rev.2-Vol.4
DE92040002	DOE/PC/89661–T5
DE92040003	DOE/PC/89661–T4
DE92040008	DOE/ER/40315–195
DE92040011	DOE/ER/40270–36
DE92040024	CONF-920721–9
DE92040031	CONF-920305–14
DE92040033	CONF-9209181–1
DE92040047	WSRC-RP–91-1151
DE92040048	WSRC-MS–92-286
DE92040051	GA-A–20914
DE92040055	SSCL-SR–1213
DE92040057	DOE/BP/16475–2
DE92040058	DOE/BP/12031–1
DE92040059	DOE/BP/07103–2
DE92040064	DOE/ER/40561–68-INT92
DE92040065	DOE/ER/45415–3
DE92040079	DOE/ER/40561–68
DE92040082	DOE/BP/38906–1
DE92040093	SAND–92-0669C
DE92040096	SAND–91-2774C
DE92040105	ARH–59-Del.
DE92040106	ARH–60-Del.
DE92040109	ARH–307-Del.
DE92040111	ARH–309-Del.
DE92040145	DOE/ID/12934–4
DE92040146	DOE/ID/12934–3
DE92040147	DOE/ID/12934–2
DE92040148	DOE/ID/12934–1
DE92040152	DOE/RA/50219–21-Pt.1
DE92040153	DOE/RA/50219–21-Pt.2
DE92040159	DOE/ER/13636–T2
DE92040165	WSRC-MS–92-269
DE92040169	WSRC-MS–92-279
DE92040178	DOE/ER/60600–1
DE92040179	DOE/ER/60600–2
DE92040180	DOE/PC/79931–T13
DE92040181	DOE/ER/13505–3
DE92040188	LA-UR–92-2290
DE92040196	DPW–5189
DE92040239	LA-UR–92-2706
DE92040240	LA-UR–92-2705
DE92040241	LA-UR–92-2704
DE92040242	LA-UR–92-2703
DE92040244	LA-UR–92-2698
DE92040245	LA-UR–92-2692
DE92040250	LA-UR–92-2666
DE92040322	DOE/OR–1047-D1
DE92040323	LA–12360-T
DE92040332	DUN–2634-RD
DE92040341	DOE/ER/14220–1
DE92040343	DOE/ER/60725–1
DE92040344	LA-UR–92-2603
DE92040345	LA-UR–92-2583
DE92040346	LA-UR–92-2580
DE92040347	LA-UR–92-2582
DE92040348	LA-UR–92-2547
DE92040349	LA-UR–92-2548
DE92040350	LA-UR–92-2553
DE92040357	LA-UR–92-2864
DE92040358	LA-UR–92-2859
DE92040359	DOE/ER/13622–T2
DE92040383	DOE/BC/14250–12
DE92040384	LA-UR–92-2557
DE92040386	LA-UR–92-2545
DE92040389	LA-UR–92-2536
DE92040405	CONF-9205214–
DE92040413	WHC-EP–0399-Rev.2
DE92040419	ANL/TM–413-Rev.1
DE92040426	UCRL-ID–109684
DE92040427	SSCL–512
DE92040428	DOE/FE–0242P(12/91)
DE92040439	FNAL-TM–1784
DE92040441	DOE/AD–0033P
DE92040442	DOE/ER–0558T
DE92040444	SAND–90-0351
DE92040458	DOE/ER/40661–3
DE92040485	DOE/ER–0544P
DE92040642	DOE/ER–0557T
DE92040644	SSCL–580
DE92040645	SSCL–578
DE92040646	SSCL–428
DE92040647	SAND–91-7070
DE92040700	DOE/EIA–0109(92/08)
DE92040815	MLM–3755
DE92040816	MLM–3751
DE92040839	SAND–92-0482
DE92040934	UCRL-MA–104861-Ver.2-3
DE92040942	SAND–91-2804C
DE92040944	SLAC-PUB–5864
DE92040945	SLAC-PUB–5822
DE92040946	ORNL/TM–12000

Order No.	*Report No.*
DE92040947	UCID–21816
DE92040950	ANL/FPP/TM–258
DE92041011	DOE/ER/53198–203
DE92041012	DOE/ER/53198–202
DE92041013	DOE/ER/53198–201
DE92041044	UCRL-ID–111352
DE92041228	SSCL–583
DE92041230	ORNL/TM–12184
DE92041242	K/CSD/TM–101
DE92041358	ANL/FPP/TM–260
DE92041363	ORNL/TM–12075
DE92557961	INIS-mf–14069
DE92562499	NAL-TR–1121T
DE92562500	NAL-TR–1117
DE92562509	ETDE/JP-mf–92562509
DE92562517	ETDE/JP-mf–92562517
DE92562525	IEE–IC91
DE92562526	IEE–SR230
DE92562527	IEE–SR231
DE92562528	IEE–SR232
DE92562529	IEE–SR-233
DE92562530	IEE–SR234
DE92562845	NEI-DK–909
DE92562846	DTH-LV-MEDD–223
DE92562847	DTH-LFK-F–159-01
DE92562848	AUC-IBT-R–9119
DE92562849	RISO-M–2947
DE92562850	DTH-LV–88-16
DE92562851	DTH-LV–87-26
DE92562852	DTH-LV–87-24
DE92562853	DTH-LFK-F–122-01
DE92562854	DTH-LV-MEDD–229
DE92562855	DTH-LV-MEDD–202
DE92562856	DTH-LV-MEDD–201
DE92562857	DTH-LV-MEDD–225
DE92562858	DTH-LV-MEDD–226
DE92562859	RISO-R–615
DE92562860	RISO-R–612
DE92562862	NEI-DK–916
DE92562863	NEI-DK–915
DE92562864	NEI-DK–919
DE92562865	NEI-DK–912
DE92562866	NEI-DK–913
DE92562867	NEI-DK–914
DE92562871	NEI-DK–904
DE92562872	NEI-DK–910
DE92562873	NEI-DK–920
DE92562874	NEI-DK–908
DE92562875	NEI-DK–905
DE92562876	NEI-DK–907
DE92562877	NEI-DK–906
DE92562879	NEI-DK–917
DE92562880	NEI-DK–918
DE92562881	NEI-DK–903
DE92562894	KTM/E-B–108
DE92562895	KTM/E-B–111
DE92562896	NEI-FI–165
DE92562897	NEI-FI–166
DE92562898	NEI-FI–167
DE92562899	SSY-JULK–1/92
DE92562900	NEI-FI–169
DE92562901	NEI-FI–170
DE92562902	NEI-FI–171
DE92562903	NEI-FI–172
DE92562904	NEI-FI–173
DE92562905	TKKK-C–2/1991
DE92562906	OY/PSTL-TIED–78
DE92562907	OY/TEK-EL–10
DE92562908	OY/TEK-EL–9
DE92562933	YMP-A–67/1988
DE92562934	YMP-A–79/1989
DE92562935	YMP-A–44/1986
DE92562936	YMP-A–42/1986
DE92562937	YMP-A–64/1987
DE92562938	GTK-TURVE–230
DE92562939	GTK-TURVE–231
DE92562940	GTK-TURVE–232
DE92562941	GTK-TURVE–233
DE92562942	GTK-TURVE–234
DE92562943	GTK-TURVE–235
DE92562944	GTK-TURVE–236
DE92562945	GTK-TURVE–237
DE92562946	GTK-TURVE–238
DE92562947	GTK-TURVE–239
DE92562948	GTK-TURVE–216
DE92562949	GTK-TURVE–218
DE92562950	GTK-TURVE–219
DE92562951	GTK-TURVE–220
DE92562952	GTK-TURVE–222
DE92562953	GTK-TURVE–223
DE92562954	GTK-TURVE–224
DE92562955	GTK-TURVE–225
DE92562956	GTK-TURVE–226
DE92562957	GTK-TURVE–227
DE92562958	GTK-TURVE–228
DE92562959	GTK-TURVE–229
DE92562960	GTK-TURVE–125
DE92562961	GTK-TURVE–240
DE92562962	GTK-TURVE–241
DE92562963	GTK-TURVE–242
DE92562964	GTK-TURVE–243
DE92562965	GTK-TURVE–244
DE92562966	GTK-TURVE–245
DE92562967	GTK-TURVE–246
DE92562968	GTK-TURVE–247
DE92562969	AAA-REP–88-2
DE92562970	AAA-REP–88-3
DE92562971	AAA-REP–88-4
DE92562972	AAA-REP–89-1
DE92562973	AAA-REP–89-2
DE92562974	AAA-REP–89-4
DE92562975	AAA-REP–90-4
DE92562976	AAA-REP–89-5
DE92562977	AAA-REP–91-1
DE92562978	AAA-REP–91-4
DE92562979	AAA-REP–91-5
DE92562980	AAA-REP–91-8
DE92562985	NUI-R–5-90
DE92562988	NEI-NO–247
DE92562989	NEI-NO–248
DE92562990	NINA-R–017
DE92562991	CMI-R–90/A30005
DE92562992	NEI-NO–249
DE92563012	NEI-NO–244
DE92563013	NEI-NO–245
DE92563017	NEI-NO–246
DE92563018	NUTEK-R–92-10
DE92563019	NUTEK-EO–92-1
DE92563020	NUTEK-FJV–92-1
DE92563021	NUTEK-VIND–92-3
DE92563022	NUTEK-B–91-9
DE92563024	NUTEK-B–92-2
DE92563025	NUTEK-ALTD–92-2
DE92563026	NUTEK-FBT–92-7
DE92563027	NUTEK-FBT–92-8
DE92563028	NUTEK-FBT–92-9
DE92563029	NUTEK-KOL–92-2
DE92563030	NUTEK-NGAS–92-1
DE92563031	NUTEK-NYEL–92-1
DE92563032	NUTEK-TB–92-4
DE92563033	LUTMDN-TMVK–5211-1-39-92
DE92563034	RVF–92-2
DE92563036	IVL-B–1048
DE92563038	LUTKDH-TKMB–1017
DE92563039	KTH-KRV-R–91-7
DE92563046	KVM–28
DE92563048	SMHI-RO–14-92
DE92563050	SIB-TN–28
DE92563052	LUTMDN-TMVK–7007-1-106-91
DE92563053	LUTMDN-TMKT–5133-1-68-92
DE92563054	LUNBDS-NBBE–92-1036
DE92563055	LUTEDX-TEIE–5057-1-60-91
DE92563057	SNV–3963
DE92563058	SNV–3968
DE92563059	SNV–3944
DE92563060	SNV–3945
DE92563061	SNV–3990
DE92563062	LUTKDH-TKKT–1020-1-179-92
DE92563064	BFR-D–7-92
DE92563065	BFR-R–13-92
DE92563066	NUTEK-TB–92-5
DE92563067	NUTEK-EO–92-2
DE92563068	NUTEK-FBT–92-10
DE92563069	NUTEK-SL–92-1
DE92563070	NUTEK-TB–92-6
DE92563071	NUTEK-VIND–92-4
DE92563072	NUTEK-VIND–92-7
DE92563073	NUTEK-B–92-4
DE92563074	NUTEK-R–92-8
DE92563088	IVL-B–1056
DE92563089	IVL-B–1057
DE92563090	IVL-B–1061
DE92563091	SV-UB–91-69
DE92563092	SV-UG–92-3
DE92563093	BFR-D–2-92
DE92563094	BFR-D–5-92
DE92563095	BFR-T–18-92
DE92563096	LUTKDH-TKKA–7005-1-35-91
DE92563097	LUTMDN-TMVS–1002
DE92565717	ETSU-S–1163/7
DE92566582	FRNC-TH–3718
DE92566617	IFP–39-411
DE92566618	IFP–39-530
DE92566619	CEA-R–5576
DE92566620	CEA-R–5581
DE92566621	CEA-CONF–10848
DE92566622	CEA-CONF–10849
DE92566624	CEA-CONF–10891
DE92566625	CEA-CONF–10892
DE92566629	CEA-CONF–10945
DE92566630	CEA-CONF–10944
DE92566631	CEA-CONF–10943
DE92566642	FRNC-TH–3719
DE92566698	CEA-CONF–10837
DE92566699	CEA-CONF–10839
DE92566700	CEA-CONF–10850
DE92566701	CEA-CONF–10840
DE92566702	CEA-CONF–10841
DE92566703	CEA-CONF–10842
DE92566704	CEA-CONF–10845
DE92566705	CEA-CONF–10846
DE92566706	CEA-CONF–10847
DE92566707	CEA-CONF–10855
DE92566708	FRCEA-TH–360
DE92566709	SCPRI-RM–12-1991
DE92566719	CEA-CONF–10490
DE92566720	CEA-CONF–10838
DE92566721	CEA-CONF–10843
DE92566722	CEA-CONF–10852
DE92566723	CEA-CONF–10853
DE92566724	CEA-CONF–10854

Order No.	Report No.
DE92566725	CEA-CONF–10856
DE92566726	CEA-CONF–10857
DE92566727	CEA-CONF–10858
DE92566737	CEA-R–5569
DE92566738	CEA-R–5578
DE92566739	CEA-R–5582
DE92570037	IPNO–1990/1
DE92570058	IPNO-DRE–91-10
DE92570059	IPNO-DRE–91-13
DE92570060	IPNO-DRE–91-16
DE92570061	IPNO-DRE–91-17
DE92570062	IPNO-DRE–91-18
DE92570063	IPNO-DRE–91-19
DE92570064	IPNO-DRE–91-20
DE92570065	IPNO-DRE–91-23
DE92570066	IPNO-DRE–91-24
DE92570067	GANIL-A–91-02
DE92570068	GANIL-A–91-03
DE92570069	GANIL-A–91-04
DE92570070	GANIL-P–91-17
DE92570071	GANIL-P–91-18
DE92570072	GANIL-P–91-19
DE92570073	IPNO-TH–90-73
DE92570074	IPNO-TH–90-84
DE92570075	IPNO-TH–91-10
DE92570076	IPNO-TH–91-14
DE92570077	IPNO-TH–91-15
DE92570078	IPNO-TH–91-17
DE92570079	IPNO-TH–91-20
DE92570080	IPNO-TH–91-29
DE92570081	IPNO-TH–91-40
DE92570082	IPNO-TH–91-41
DE92570083	IPNO-TH–91-42
DE92570084	IPNO-TH–91-48
DE92570085	ISN–91-20
DE92570086	ISN–91-28
DE92570087	LAPP-TH–292/90
DE92570088	LAPP-TH–322/90
DE92570089	LAPP-TH–325/91
DE92570090	LAPP-TH–326/91
DE92570091	LAPP-TH–329/91
DE92570092	LAPP-TH–333/91
DE92570093	LAPP-TH–339/91
DE92570094	LAPP-TH–342/91
DE92570095	LAPP-TH–343/91
DE92570096	LYCEN–91-21
DE92570097	CRN-HE–91-05
DE92570098	CRN-HE–91-06
DE92570099	CRN-PHTH–91-12
DE92570100	CRN-PHTH–91-16
DE92570101	CRN-PN–91-18
DE92570102	CRN-PN–91-22
DE92570103	GANIL-P–91-16
DE92570104	GANIL-P–91-22
DE92570105	GANIL-P–91-23
DE92570106	IPNO-DRE–91/11
DE92570107	IPNO-DRE–91-22
DE92570108	IPNO-TH–91-07
DE92570109	IPNO-TH–91-16
DE92570110	ISN–91-05
DE92570111	LAL–91-45
DE92570112	LAL–91-47
DE92570113	LAL–91-48
DE92570114	LAL–91-49
DE92570115	LAL–91-61
DE92570116	LAL–91-62
DE92570117	LAL-RT–91-10
DE92570118	LAL-RT–91-08
DE92570119	LAL-RT–91-09
DE92570120	LAL–91-63
DE92570121	LAPP-TH–314/90
DE92570122	LAPP-TH–328
DE92570123	LAPP-TH–331/91
DE92570124	LAPP-TH–337/91
DE92570125	LNS-PH–91-15
DE92640589	IPEN-PUB–361
DE92642251	IAEA-TECDOC–657
DE92642678	INIS-mf–13336
DE92642842	JINR-R–6-91-123
DE92642843	JINR-R–6-91-215
DE92643051	IC–92/120
DE92643076	JINR-R–13-91-128
DE92643802	AEA-EE–0147
DE92643815	JINR-R–6-91-214
DE92643816	RISO-R–571
DE92643901	INIS-mf–13347
DE92643932	SKB-TR–91-48
DE92643933	SKB-TR–91-49
DE92643934	SKB-TR–91-51
DE92643935	SKB-TR–91-52
DE92643936	STRIPA-IR–91-32
DE92643937	STRIPA-TR–91-26
DE92643938	STRIPA-TR–91-27
DE92643939	STRIPA-TR–91-28
DE92643940	STRIPA-TR–91-29
DE92643941	STRIPA-TR–91-31
DE92643942	STRIPA-TR–91-35
DE92643943	STRIPA-TR–91-36
DE92643944	STRIPA-TR–91-37
DE92643947	SKB-TR–91-50
DE92643948	SNV–3949
DE92643950	TRITA-KUT–92-1066
DE92643959	JINR-R–11-91-68
DE92643960	TRITA-EPP–91-05
DE92644015	JINR-E–19-91-334
DE92644040	INFO–0417-1
DE92644105	INIS-mf–13215
DE92644131	NEI-DK–900
DE92644156	JINR–16-90-482
DE92644184	NEI-NO–224
DE92644271	FEI–2103
DE92644272	FEI–2110
DE92644273	FEI–2139
DE92644280	LIU-TEK-LIC–1991-41
DE92644284	JINR-R–9-91-324
DE92644285	JINR-R–9-91-61
DE92644290	JINR-E–9-91-156
DE92644291	JINR-R–9-91-226
DE92644292	JINR-R–9-91-246
DE92644293	JINR-R–9-91-301
DE92644294	JINR-R–9-91-91
DE92644306	JINR-R–9-90-581
DE92644309	JINR–9-91-76
DE92644310	NIIEFA-P-V–0847
DE92644311	JINR-R–13-91-245
DE92644312	JINR-R–9-91-255
DE92644313	JINR-R–9-91-83
DE92644314	JINR–8-90-66
DE92644315	NIIEFA-P-V–0846
DE92644326	JINR-D–1-91-96
DE92644327	JINR-E–9-91-178
DE92644328	JINR-E–9-91-293
DE92644329	JINR-E–9-91-51
DE92644330	JINR-R–9-90-548
DE92644331	JINR-R–9-91-99
DE92644343	SA-FOU–91-09
DE92644354	RISO-R–619
DE92644404	JINR-R–10-91-155
DE92644405	JINR-R–7-91-224
DE92644426	JINR-E–13-91-175
DE92644429	JINR-R–1-90-32
DE92644430	JINR-R–1-91-209
DE92644431	JINR-R–1-91-88
DE92644432	JINR-R–10-90-83
DE92644433	JINR–13-91-204
DE92644434	JINR–13-91-251
DE92644540	JINR-R–13-91-337
DE92644545	JINR-R–10-90-131
DE92644546	JINR-R–10-90-88
DE92644547	JINR-R–11-90-141
DE92644548	JINR-R–13-91-282
DE92644549	JINR-R–13-91-283
DE92644554	JINR-R–13-91-201
DE92644559	SKB-TR–91-59
DE92644569	STRIPA-TR–91-30
DE92644588	SAPE-CPI–8
DE92644641	IAEA-INFCIRC–254(Rev.1/Pt.2)
DE92644651	JINR-E–11-91-353
DE92644652	JINR-R–11-90-501
DE92644658	SKB-TR–91-07
DE92644662	NEI-SE–95
DE92644663	OUP–92-09
DE92644664	RISO-R–607
DE92644665	RISO-R–611
DE92644666	RISO-R–625
DE92644668	IC–92/127
DE92644669	IC–92/128
DE92644670	IC–92/130
DE92644671	JINR-E–2-91-97
DE92644672	JINR-E–5-91-174
DE92644673	JINR-R–11-91-100
DE92644674	JINR-R–11-91-138
DE92644675	JINR-R–17-91-271
DE92644676	JINR-R–2-91-258
DE92644677	JINR-R–4-91-127
DE92644678	JINR-R–4-91-254
DE92644679	JINR-R–4-91-261
DE92644713	IC–92/105
DE92644714	IC–92/134
DE92644715	IC–92/141
DE92644716	INP-MSU–90-56-202
DE92644717	INP-MSU–91-10-214
DE92644718	JINR-E–2-91-296
DE92644721	IC–92/122
DE92644722	IC–92/124
DE92644723	IC–92/129
DE92644724	IC–92/131
DE92644725	IC–92/133
DE92644726	IC–92/135
DE92644727	IC–92/138
DE92644728	IC–92/144
DE92644729	IC–92/145
DE92644730	IC–92/149
DE92644731	IC–92/95
DE92644732	IHEP-OTF–90-90
DE92644733	INP-MSU–91-11-215
DE92644734	INP-MSU–91-15-219
DE92644735	JINR-E–2-90-587
DE92644736	JINR-E–2-91-118
DE92644737	JINR-E–2-91-157
DE92644738	JINR-E–2-91-184
DE92644739	JINR-E–2-91-195
DE92644740	JINR-E–2-91-266
DE92644741	JINR-E–2-91-272
DE92644742	JINR-E–2-91-281
DE92644743	JINR-E–2-91-77
DE92644744	JINR-E–2-91-78
DE92644745	OUP–91-30
DE92644746	OUP–92-05
DE92644844	IC–92/126
DE92644845	IC–92/140
DE92644846	JINR-E–2-91-260
DE92644869	IFVE-OMVT–90-80
DE92644873	JINR-E–2-91-115
DE92644874	JINR-R–2-91-140

Order No.	Report No.
DE92644888	IC–92/137
DE92644896	JINR-E-2-91-253
DE92644913	IC–92/139
DE92644947	IHEP-OTF–91-33
DE92644948	JINR-E-2-91-183
DE92644949	NIIYaF-MGU–90-37-183
DE92644960	IC–92/166
DE92645036	JINR-E-2-91-180
DE92645054	IC–92/167
DE92645055	JINR-E-2-91-114
DE92645067	INP–1487
DE92645069	JINR-E-2-91-150
DE92645070	JINR-R–4-91-167
DE92645071	OUP–92-07
DE92645115	JINR-D–6-91-199
DE92645116	JINR-E–4-91-169
DE92645139	OUP–92-08
DE92645153	JINR-E-2-91-92
DE92645154	JINR-E–4-91-126
DE92645162	JINR-R–15-91-8
DE92645168	JINR-E–4-91-106
DE92645170	JINR-R–3-91-244
DE92645178	JINR-R–1-91-239
DE92645189	JINR-E–4-91-132
DE92645190	JINR-E–4-91-213
DE92645191	JINR-R–1-91-206
DE92645192	JINR-R–16-91-107
DE92645232	JINR-E–1-91-146
DE92645237	FEI–2155
DE92645238	JINR-R–16-91-177
DE92645239	JINR-R–3-91-202
DE92645240	LIYaF–90-1605
DE92645250	INP-MSU–90-34-180
DE92645303	IC–92/152
DE92645304	CTH-IEFT-PP–1992-01
DE92645305	CTH-IEFT-PP–1992-02
DE92645306	CTH-IEFT-PP–1992-03
DE92645307	CTH-IEFT-PP–1992-05
DE92645314	TRITA-EPP–91-02
DE92645357	INP-MSU–90-58-204
DE92645358	JINR-D-13-91-200
DE92645359	JINR-D–15-91-289
DE92645360	JINR-D–15-91-290
DE92645515	LIYaF–90-1608
DE92645691	IC–92/136
DE93000802	CONF-9111214–
DE93000803	JINR-D-19-90-457
DE93000804	INIS-BR–2924
DE93000805	JINR-N–2-48-91
DE93601184	CNIC–00443
DE93601273	CNIC–00471
DE93601310	CNIC–00344
DE93601314	CNIC–00396
DE93601315	CNIC–00509
DE93601327	CNIC–00539
DE93601350	CNIC–00411
DE93601351	ECN-RX–91-103
DE93601352	INIS-mf–13351
DE93601363	CNIC–00542
DE93601365	ECN-I–91-034
DE93601366	ECN-I–91-060
DE93601382	CEAC-R–2-91
DE93601397	CNIC–00504
DE93601399	CNIC–00387
DE93601403	ECN-RX–91-069
DE93601407	RIVM–249200001
DE93601408	CNIC–00389
DE93601409	CNIC–00484
DE93601467	PSI–120
DE93601475	CEAC-R–4-91
DE93601521	CNIC–00496
DE93601535	NRCN(ER)–029
DE93601565	CNIC–00458
DE93601566	CNIC–00469
DE93601567	CNIC–00474
DE93601568	CNIC–00483
DE93601569	CNIC–00485
DE93601637	CNIC–00454
DE93601638	CNIC–00461
DE93601639	CNIC–00462
DE93601640	CNIC–00490
DE93601641	CNIC–00497
DE93601642	CNIC–00499
DE93601651	CNIC–00456
DE93601652	CNIC–00520
DE93601653	INIS-mf–13355
DE93601696	CNIC–00459
DE93601708	INIS-mf–13354
DE93601718	CNIC–00445
DE93601719	CNIC–00467
DE93601720	CNIC–00518
DE93601736	CNIC–00544
DE93601858	INIS-mf–13353
DE93601956	ECN-I–92-021
DE93601957	ECN-I–92-022
DE93601966	CEAC-R–4-92
DE93601967	CNIC–00424
DE93601968	CNIC–00505
DE93601969	CNIC–00523
DE93601977	CNIC–00394
DE93601978	CNIC–00477
DE93601980	NRCN(TE)–009
DE93601992	CNIC–00529
DE93601995	CNIC–00406
DE93601996	CNIC–00416
DE93601997	CNIC–00482
DE93601998	CNIC–00487
DE93601999	CNIC–00489
DE93602006	CNIC–00388
DE93602007	CNIC–00397
DE93602009	JINR-R–9-91-82
DE93602010	JINR-R–9-91-84
DE93602011	NIKHEF-K-AmPS–92-01
DE93602017	NIKHEF-H–92-03
DE93602020	NIKHEF-K-AmPS–91-08
DE93602023	CNIC–00373
DE93602024	CNIC–00374
DE93602036	INIS-mf–13350
DE93602041	CEAC-R–5-92
DE93602042	ECN-RX–91-049
DE93602048	CNIC–00420
DE93602049	CNIC–00444
DE93602057	CNIC–00346
DE93602058	CNIC–00455
DE93602061	ECN-RX–91-044
DE93602062	ECN-RX–91-106
DE93602063	ECN-RX–91-110
DE93602088	YJT–92-03
DE93602092	CNIC–00331
DE93602093	CNIC–00340
DE93602094	CNIC–00343
DE93602096	CNIC–00347
DE93602097	CNIC–00362
DE93602098	CNIC–00365
DE93602100	CNIC–00479
DE93602101	CNIC–00503
DE93602102	CNIC–00512
DE93602103	CNIC–00541
DE93602104	CNIC–00545
DE93602106	IAEA-TECDOC–659
DE93602108	INIS-mf–13352
DE93602118	INIS-mf–13337
DE93602119	INIS-mf–13338
DE93602120	INIS-mf–13341
DE93602127	INIS-mf–13342
DE93602138	CNIC–00363
DE93602139	CNIC–00478
DE93602140	CNIC–00540
DE93602144	ECN-I–91-068
DE93602145	ECN-I–92-012
DE93602147	PSI–123
DE93602151	CNIC–00422
DE93602173	CNIC–00385
DE93602223	CNIC–00465
DE93602224	OUP–92-20
DE93602225	OUP–92-21
DE93602304	CEAC-R–5-91
DE93602310	CNIC–00337
DE93602311	CNIC–00341
DE93602312	CNIC–00448
DE93602313	CNIC–00468
DE93602314	ECN-C–91-076
DE93602322	CNIC–00376
DE93602330	ECN-I–92-013
DE93602339	ECN-C–91-048
DE93602340	ECN-C–91-051
DE93602341	ECN-C–91-052
DE93602343	ECN-C–91-061
DE93602345	ECN-C–91-079
DE93602346	ECN-C–92-016
DE93602349	IAEA-TECDOC–661
DE93602354	YJT–90-13
DE93602355	YJT–91-19
DE93602356	YJT–91-22
DE93602357	YJT–91-24
DE93602358	YJT–92-01
DE93602359	YJT–92-02
DE93602362	IFE/KR/E–92/005
DE93602366	CNIC–00549
DE93602375	CNIC–00516
DE93602376	CNIC–00517
DE93602436	CNIC–00488
DE93602444	CNIC–00401
DE93602454	INIS-mf–13346
DE93602457	CNIC–00342
DE93602458	CNIC–00403
DE93602460	CNIC–00460
DE93602462	ECN-I–92-015
DE93602463	ECN-RX–91-063
DE93602464	OUP–92-19
DE93602472	NEI-NO–250
DE93602474	JINR-R–11-91-111
DE93602475	OUP–92-18
DE93602476	OUP–92-24
DE93602477	OUP–92-25
DE93602496	CNIC–00400
DE93602500	NIKHEF-H–92-05
DE93602505	IC–92/132
DE93602506	NIKHEF-H–92-07
DE93602555	NIKHEF-H–92-06
DE93602581	CNIC–00463
DE93602602	JINR-E–11-91-108
DE93602603	JINR-E–2-91-262
DE93602624	JINR-R–2-91-211
DE93602625	JINR-R–4-91-163
DE93602626	OUP–92-12
DE93602654	OUP–92-16
DE93602673	JINR-E–2-91-171
DE93602695	CNIC–00492
DE93602702	ECN-RX–91-050
DE93602703	ECN-RX–91-054
DE93602706	JINR-E–7-91-149
DE93602707	JINR-R–4-91-170
DE93602740	OUP–92-22
DE93602758	CNIC–00371
DE93602786	ECN-RX–91-051

Order No.	Report No.
DE93602787	ECN-RX–91-061
DE93602821	ECN-RX–91-046
DE93602903	CEAC-R–3-92
DE93602910	CEAC-R–2-92
DE93602944	CNIC–00381
DE93602948	CNIC–00493
DE93602951	CNIC–00369
DE93602961	CNIC–00328
DE93602962	CNIC–00435
DE93602963	CNIC–00466
DE93602964	CNIC–00475
DE93602996	CNIC–00480
DE93602998	NIKHEF-H–92-04
DE93603005	CNIC–00464
DE93603006	ECN-RX–92-013
DE93603008	CFFTP-G–9127
DE93603009	ECN-C–91-036
DE93603013	ECN-I–91-032
DE93603015	ECN-I–91-037
DE93603021	ECN-RX–91-067
DE93603022	ECN-RX–91-102
DE93603032	CNIC–00367
DE93603071	CNIC–00446
DE93603072	CNIC–00470
DE93603073	CNIC–00472
DE93603142	CNIC–00515
DE93603143	ECN-C–91-067
DE93701048	CEA-CONF–10884
DE93701049	CEA-CONF–10969
DE93701093	CEA-CONF–10975
DE93701123	CEA-N–2680
DE93701125	LYCEN-T–9115
DE93701126	LYCEN-T–9123
DE93701127	CRN-HE–91-07
DE93701128	CRN-CPR–91-09
DE93701129	CRN-CPR–91-07
DE93701130	CRN-PHTH–91-19
DE93701136	SCPRI-RM–01-1992
DE93701142	CEA-LNS-GT–91-08
DE93701156	LAL-RT–92-04
DE93701157	LAL–92-06
DE93701158	LAL–92-07
DE93701159	LAL–92-15
DE93701201	CEA-LNS-GT–92-01
DE93701203	CEA-LNS-GT–92-04
DE93701205	CEA-LNS-Ph–92-14
DE93701213	CEA-CONF–10972
DE93701223	SCPRI-RM–02-1992
DE93701251	CEA-CONF–10946
DE93701253	CEA-CONF–10947
DE93701255	CEA-CONF–10948
DE93701257	CEA-CONF–10941
DE93701259	CEA-CONF–10940
DE93701261	CEA-CONF–10939
DE93701263	CEA-CONF–10938
DE93701319	FRCEA-TH–361
DE93701320	FRCEA-TH–362
DE93701321	FRCEA-TH–363
DE93701323	IFP–39478
DE93701369	CRN-CPR–91-03
DE93702060	INIS-mf–14081
DE93702130	INIS-mf–14055
DE93702170	INIS-mf–14060
DE93702242	INIS-mf–14080
DE93702252	KFK–5046
DE93702329	INIS-mf–14064
DE93702331	HMI-B–495
DE93702338	INIS-mf–14082
DE93702350	KFK–4993
DE93702448	GSF–42/91
DE93702475	KFK–4994
DE93702478	KFK–4964
DE93702480	KFK–4760
DE93702566	INIS-mf–14071
DE93703325	JAERI-M–92-017
DE93703437	GANIL-P–92-04
DE93703439	GANIL-P–92-05
DE93703445	GANIL-P–91-24
DE93703447	CRN-HE–90-04
DE93703451	ISN–90-59
DE93703482	JAERI-M–92-011
DE93703493	JAERI-M–92-041
DE93703496	JAERI-M–92-045
DE93703535	JAERI-M–92-046
DE93703538	JAERI-M–92-015
DE93703542	JAERI-M–92-049
DE93703545	JAERI-M–92-056
DE93703564	JAERI–1326
DE93703568	JAERI-M–92-058
DE93703572	JAERI-M–92-044
DE93703577	JAERI-M–92-057
DE93703725	LAPP-EXP–91-05
DE93703729	LAPP-EXP–91-07
DE93703731	LAPP-EXP–91-09
DE93703820	INIS-JP–007
DE93703829	LAPP-TH–346/91
DE93703833	LAPP-TH–350/91
DE93703836	LAPP-TH–344/91
DE93703957	JAERI-M–91-214
DE93703960	JAERI-M–91-216
DE93704237	NIRS-AR–34
DE93704262	KEK-PR–91-2
DE93704288	RCNP-T–29
DE93704290	RCNP-T–30
TI92017831	DOE/ID–22102
TI92018591	NUREG/CR–5700
TI92018700	NUREG/CP–0124
TI92018765	NUREG–1457
TI92018773	NUREG/CR–5646
TI92018775	NUREG/CR–6010
TI92018944	NUREG/CR–4469-Vol.14
TI92018945	NUREG/CR–4469-Vol.13
TI92019022	NUREG/CR–5779-Vol.1
TI92019024	NUREG/CR–4819-Vol.2
TI92019025	NUREG/CR–3320-Vol.2
TI92019054	DOE/RW–0184-R1-Vol.4
TI92019055	DOE/RW–0184-R1-Vol.3
TI92019056	DOE/RW–0184-R1-Vol.2
TI92019057	DOE/RW–0184-R1-Vol.1
TI92019210	NUREG/CR–5685
TI92019298	NUREG/CP–0120
TI92019369	NUREG–1442-Rev.1
TI92019402	DOE/IG–92019402
TI92019403	DOE/IG–92019403
TI92019438	NUREG/CR–6001
TI92019605	NUREG/CR–5810
TI92019680	NUREG/IA–0067
TI92019706	FASAC-TAR–92019706
TI92019896	NUREG/CR–4832-Vol.3-Pt.2
TI92019994	NUREG/CR–5891
TI92019998	NUREG/CR–5378
TI92040183	NUREG–0750-Vol.35-No.6
TI92040315	NUREG/CR–4391
TI92040423	DOE/IG–92040423
TI92040424	DOE/IG–92040424
TI92040425	DOE/IG–92040425
TI92040943	ER-BC–92-03
TI92566643	EUR–13851
TI92566644	EUR–13873
TI92566645	EUR–13879
TI92566646	EUR–13882
TI92566647	EUR–13903
TI92566648	EUR–13917
TI92566649	EUR–13964
TI92566650	EUR–13581
TI92566651	EUR–13870/1
TI92566652	EUR–13870/2
TI92566653	EUR–13870/3
TI92566654	EUR–13883
TI92566655	EUR–13918
TI92566656	EUR–13955
TI92566657	EUR–14082
TI92566730	EUR-CEA-FC–1442
TI92566731	EUR-CEA-FC–1443
TI92566732	EUR-CEA-FC–1444
TI92566733	EUR-CEA-FC–1445
TI92566734	EUR-CEA-FC–1446

Codes Used on Index Lines

Following the citation numbers in the Corporate Author, Personal Author, and Subject Indexes, codes are used to designate the type of document, country of publication, and language of the document, e.g., (R;SU;In Russian). The language designator does not appear if the document is published in English.

Document Types

AV	Audiovisual materials
CM	Computer media
E	Engineering materials
I	Miscellaneous
IA	Miscellaneous analytics
PA	Patent application
R	Report
RA	Report analytic

Country Codes

AD	Andorra
AE	United Arab Emirates
AF	Afghanistan
AG	Antiqua and Barbuda
AL	Albania
AM	Armenia
AO	Angola
AR	Argentina
AT	Austria
AU	Australia
AZ	Azerbaijan
BB	Barbados
BD	Bangladesh
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BH	Bahrain
BI	Burundi
BJ	Benin
BM	Bermuda
BN	Brunei Darussalam
BO	Bolivia
BR	Brazil
BS	Bahamas
BT	Bhutan
BU	Burma
BW	Botswana
BY	Belarus
BZ	Belize
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Cote d'Ivoire
CL	Chile
CM	Cameroon
CN	China
CO	Colombia
CR	Costa Rica
CS	Czechoslovakia
CU	Cuba
CV	Cape Verde
CY	Cyprus
DD	use DE
DE	Germany
DJ	Djibouti
DK	Denmark
DM	Dominica
DO	Dominican Republic
DZ	Algeria
EC	Ecuador
EE	Estonia
EG	Egypt
EP	European Patent Office
ES	Spain
ET	Ethiopia
FI	Finland
FJ	Fiji
FR	France
GA	Gabon
GB	United Kingdom
GD	Grenada
GE	Georgia
GH	Ghana
GM	Gambia
GN	Guinea
GQ	Equatorial Guinea
GR	Greece
GT	Guatemala
GW	Guinea-Bissau
GY	Guyana
HK	Hong Kong
HN	Honduras
HR	Croatia
HT	Haiti
HU	Hungary
ID	Indonesia
IE	Ireland
IL	Israel
IN	India
IQ	Iraq
IR	Iran, Islamic Republic of
IS	Iceland
IT	Italy
JM	Jamaica
JO	Jordan
JP	Japan
KE	Kenya
KG	Kyrgyzstan
KH	Democratic Kampuchea
KI	Kiribati
KM	Comoros
KP	Korea, Democratic People's Republic of
KR	Korea, Republic of
KW	Kuwait
KZ	Kazakhstan
LA	Lao People's Democratic Republic
LB	Lebanon
LC	Saint Lucia
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
LY	Libyan Arab Jamahiriya
MA	Morocco
MC	Monaco
MD	Moldova, Republic of
MG	Madagascar
ML	Mali
MM	Myanmar
MN	Mongolia
MR	Mauritania
MT	Malta
MU	Mauritius
MV	Maldives
MW	Malawi
MX	Mexico
MY	Malaysia
MZ	Mozambique
NE	Niger
NG	Nigeria
NI	Nicaragua
NL	Netherlands
NO	Norway
NP	Nepal
NR	Nauru
NZ	New Zealand
OM	Oman
PA	Panama
PE	Peru
PG	Papua New Guinea
PH	Philippines
PK	Pakistan
PL	Poland
PR	Puerto Rico
PT	Portugal
PY	Paraguay
QA	Qatar
QS	INSPEC
QZ	INPADOC
RO	Romania
RU	Russian Federation
RW	Rwanda
SA	Saudi Arabia
SB	Solomon Islands
SC	Seychelles
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SL	Sierra Leone
SM	San Marino
SN	Senegal
SO	Somalia
SR	Suriname
ST	Sao Tome and Principe
SU	USSR
SV	El Salvador
SY	Syria
SZ	Swaziland
TD	Chad
TG	Togo
TH	Thailand
TJ	Tajikistan
TM	Turkmenistan
TN	Tunisia
TO	Tonga
TR	Turkey
TT	Trinidad and Tobago
TV	Tuvalu
TW	Taiwan
TZ	Tanzania, United Republic of
UA	Ukraine
UG	Uganda
US	United States
UY	Uruguay
UZ	Uzbekistan
VA	Vatican City State, Holy See
VC	Saint Vincent and the Grenadines
VE	Venezuela
VN	Viet Nam
VU	Vanuatu
WO	WIPO
WS	Samoa
YD	use YE
YE	Yemen
YU	Yugoslavia
ZA	South Africa
ZM	Zambia
ZR	Zaire
ZW	Zimbabwe

ORDER FORM

DOE and DOE Contractors: Fill in Parts I, II, and IV. **Others:** Fill in Parts I, III, and IV. Mark appropriate blanks in Part IV to indicate quantity and form (microfiche or paper copy).

I. SHIPPING AND PAYMENT INFORMATION

Ordering Address

Name Telephone

Address

City State Zip

Shipping Address (if different from above)

Name

Address

City State Zip

SIGNATURE (Required to validate ALL orders)

II. OSTI ORDERS (DOE and DOE contractors can order from OSTI.)

☐ Charge OSTI deposit account no.

Mail orders to: U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831

III. NTIS ORDERS

☐ Charge NTIS deposit account no.

☐ Check/Money Order enclosed for $

☐ Charge to my ☐ American Express ☐ VISA ☐ Mastercard

Account Number **Card expiration date**

☐ Ship and Bill (see below for restrictions)

Employer identification number (9 digits) _ _–_ _ _ _ _ _ _

Purchase Order number

Phone number of billing office

(Required for Ship & Bill orders)

Ship & Bill service is restricted to North American business locations for an extra $7.50 per order (or per Custom Search). The business' employer identification number plus the phone number of the office paying the bill are required to process these requests. A late payment charge will be applied to billings more than 30 days overdue. Prepaying, using an NTIS Deposit Account or a charge account, speeds order processing. Be sure payment and order are sent together. Checks, payable to NTIS, must be in U.S. dollars.

Mail orders to: U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

IF NO METHOD OF PAYMENT IS INDICATED, YOUR ORDER WILL BE RETURNED TO YOU AS A PRICE QUOTE UNPROCESSED.

IV. SELECTIONS

Order number Report number
Abstract number (with vol., issue)
No. of fiche No. of paper copies

Order number Report number
Abstract number (with vol., issue)
No. of fiche No. of paper copies

Order number Report number
Abstract number (with vol., issue)
No. of fiche No. of paper copies

Order number Report number
Abstract number (with vol., issue)
No. of fiche No. of paper copies

Order number Report number
Abstract number (with vol., issue)
No. of fiche No. of paper copies

Order number Report number
Abstract number (with vol., issue)
No. of fiche No. of paper copies

DOE/OSTI–0002/0F 10/88

CUT OUT APPROPRIATE FORM AND MAIL IN A STAMPED ENVELOPE TO THE ADDRESS INDICATED.

Change of Address Form

NAME–FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY	STATE	ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

MAIL THIS FORM TO:

NEW ADDRESS
Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

Subscription Order Form

Enter my Subscription to: ____________________
(Please indicate publication)

@ $ __________ Domestic; @ $ __________ Foreign.

NAME–FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY	STATE	ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. __________

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

Federal Depository Library Program

As a result of an agreement between the U.S. Government Printing Office (GPO) and the Department of Energy, beginning in 1984 DOE reports with unlimited distribution are now included in the Federal Depository Library Program. The Regional Depository Libraries listed below receive and retain at least one copy of nearly every Federal Government publication, either in printed or microfilm form, for use by the general public. These libraries provide reference services and interlibrary loans; however, they are not sales outlets. You may wish to ask your local library to contact a Regional Depository to help you locate specific publications, or you may contact the Regional Depository yourself. Do not send checks or orders to these libraries.

ARKANSAS STATE LIBRARY
One Capitol Mall
Little Rock, AR 72201
(501) 371-2326

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
Montgomery, AL 36193
(205) 279-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.-Box S
University, AL 35486
(205) 348-7369

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor-State Cap.
1700 West Washington
Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
Tucson, AZ 85721
(602) 626-5233

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

UNIV. OF COLORADO LIB.
Government Pub. Division
Campus Box 184
Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
Govt. Pub. Department
1357 Broadway
Denver, CO 80203
(303) 571-2131

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

UNIV. OF FLORIDA LIBRARIES
Library West
Documents Department
Gainesville, FL 32611
(904) 392-0367

UNIV. OF GEORGIA LIBRARIES
Government Reference Dept.
Athens, GA 30602
(404) 542-8951

UNIV. OF HAWAII LIBRARY
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230

UNIV. OF IDAHO LIBRARY
Documents Section
Moscow, ID 83843
(208) 885-6344

ILLINOIS STATE LIBRARY
Information Services Branch
Centennial Building
Springfield, IL 62706
(217) 782-5185

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

UNIV. OF IOWA LIBRARIES
Govt. Documents Department
Iowa City, IA 52242
(319) 353-3318

UNIVERSITY OF KANSAS
Doc. Collect.-Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

UNIVERSITY OF MARYLAND
McKeldin Lib.-Doc. Div.
College Park, MD 20742
(301) 454-3034

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
(in cooperation with University of Nebraska-Lincoln)

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(in cooperation with North Dakota State Univ. Library)

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA DEPT. OF LIBRARIES
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927-Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH. UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderman Lib.-Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST. LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344